AVIATION WEEK

MAY 10, 1948

A McGRAW-HILL PUBLICATION

Controllable beam high intensity lighting at Wold-Chamberlain Field, Minneapolis—St. Paul

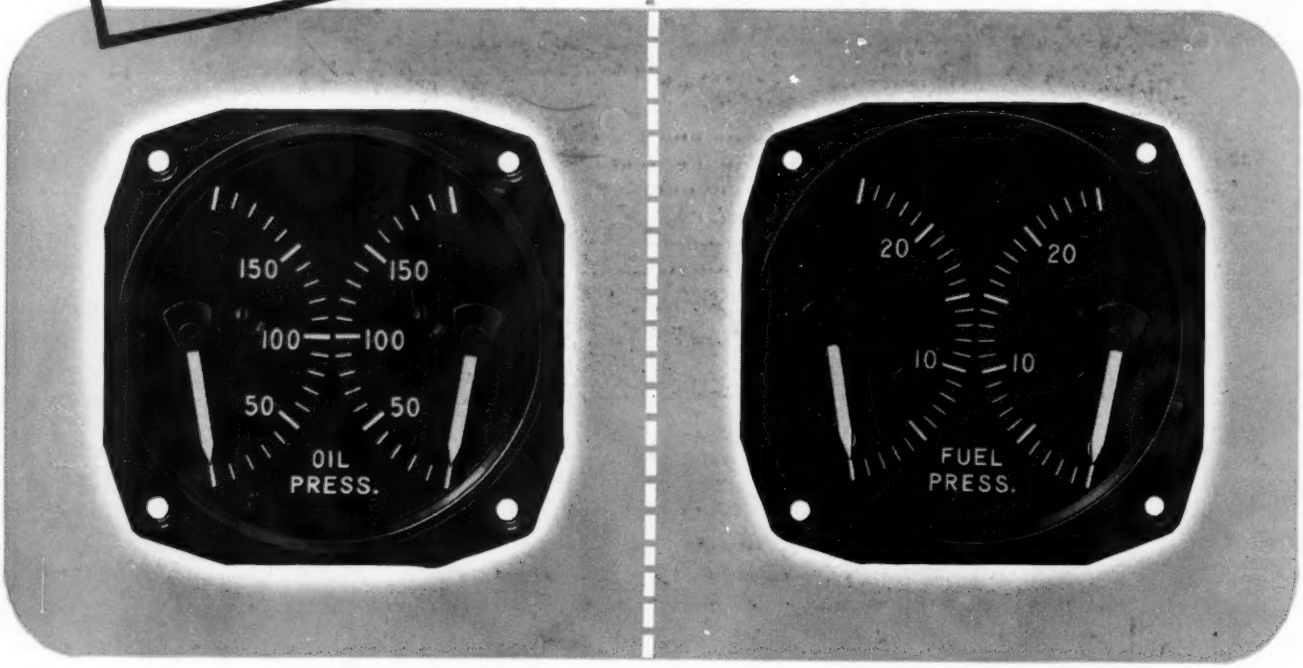
L-M-Bartow high intensity approach and runway lighting brings pilots in to safer landings, assures safer, faster take-offs, less stacking, fewer delays, fewer fatalities. When ground visibility is ⅜-mile, cockpit visibility with these lights is a mile or more . . . Controlled intensity up to 180,000 cp. . . . only lights with controllable beam direction . , , For smaller airports, L-M Package Lighting—complete equipment at $1 per runway-foot . . . Rotating beacons, runway, range, taxiway, obstruction lighting; simple, efficient control panels; transformers and all other equipment . . . *Write Airport Lighting Engineering. Line Material Co., Airport Lighting Division, East Stroudsburg, Pennsylvania.*

LINE MATERIAL Airport Lighting

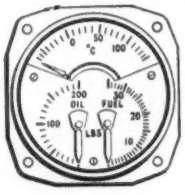
DETROIT PUB LIBRARY
TECHNOLOGY DPT
96 PUTNAM AV
DETROIT MICH

EDISON
Oil and Fuel Pressure Gages

Here are pressure gages that excel in simplicity of design and quality of workmanship. EDISON Oil Pressure Gages use a bourdon tube of hardened beryllium copper, built to withstand substantial overpressure. EDISON Fuel Pressure Gages measure differential vented fuel pressure by using a single capsule, applying fuel pressure inside the capsule and vent pressure outside.

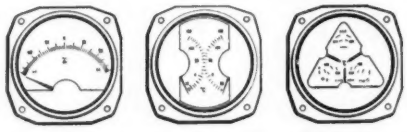


Other EDISON aircraft systems and instruments



Engine Gage Unit, incorporating Electrical Oil Temperature indication.

Temperature Measurement with Electrical Resistance Bulbs and Electrical Thermometer Indicators.



Cylinder Head Temperature Measurement . . . Electrical Thermometer Indicators with Resistance Bulbs.

Write for literature on equipment in which you are interested.

EDISON AIRCRAFT SYSTEMS AND INSTRUMENTATION

Thomas A. Edison, Incorporated, Instrument Division, 126 Lakeside Avenue, West Orange, New Jersey

PUBLIC LIBRARY
MAY 10 1948
DETROIT

Here's an engine that has been *deliberately* set on fire more than 600 times! At the Kidde proving grounds, a tandem arrangement of B-26 power plants reproduces actual flight conditions—to let our engineers test out new ideas in fire-killing. In addition, more than 1100 fires have been started in mock-ups—a total of over 1700 fires!

Though Walter Kidde & Company, Inc., is best known for its work with carbon dioxide (CO_2), we don't stop there! These 1700 fires have been snuffed out with new chemicals as well as old ones. We've held the stop-watch on methyl bromide, monochlorobromethane (CB), dachlaurin (DL), the many Freons and others. We know how quickly they kill fires—what their strong and weak points are.

Fire-fighting studies of these earthbound B-26 engines are but a part of Kidde's *continuing* research directed toward safer flying. Out of this research has come a fund of information unmatched by any other private organization. Of course, this information is always at the disposal of government agencies, aircraft manufacturers and transport companies.

WALTER KIDDE & COMPANY, INC. 518 MAIN STREET, BELLEVILLE 9, N. J.

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

FIRE EXTINGUISHING EQUIPMENT
FIRE DETECTION DEVICES
HIGH-PRESSURE CONTAINERS

Kidde
MANUFACTURING ENGINEERS

VALVES, CYLINDERS, SPHERES
TEXTILE MACHINERY
AVIATION SAFETY DEVICES

all TOPFLIGHT

all ROEBLING

THERE'S ONLY ONE STANDARD —the highest—for Roebling aircraft products. Back of them is wire engineering experience unparalleled in America... since aviation began, Roebling has contributed to improved "control in the air." And *today*, the Roebling research laboratory is working on *tomorrow's* control cord problems... to assure that every Roebling product may always be the finest that can be made.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

ROEBLING
A CENTURY OF CONFIDENCE

AVIATION WEEK

Vol. 48 No. 19 — May 10, 1948

The Aviation Week	7	New Products	32
News Digest	8	Financial	34
Headline News	11	Sales & Service	37
Aviation Calendar	16	Briefing for Dealers	43
Industry Observer	16	World News	44
Engineering-Production	17	Transport	45

Editorial 58

Robert H. Wood
EDITOR

Merlin H. Mickel
MANAGING EDITOR

Robert B. Hotz ..... News Editor
Irving Stone ..... Technical Editor
William Kroger ..... Manufacturing
Alexander McSurely ..... Sales & Service
Charles L. Adams ..... Transport Editor
Robert McLarren ..... Engineering
Katherine Johnsen ..... Congress
Stanley L. Colbert ..... Production Editor
Marie Adams ..... Editorial Assistant
Anita Scaffo ..... Editorial Assistant
Margaret Timmerman ..... Editorial Assistant
Victoria Giaculli ..... Editorial Makeup
Scholer Bangs ..... Pacific Coast Editor

Executive and Editorial Offices: 330 W. 42nd St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

Domestic News Bureau: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City, Seattle, Wichita and 43 other cities.

Foreign News Bureau: London, Paris, Berlin, Moscow, Tokyo, Bombay, Melbourne, Rio de Janeiro, Buenos Aires. Correspondents in Athens, Caracas, Santiago, Shanghai, Zurich, Rome, Johannesburg and over 40 other cities.

ECONOMIC STAFF
Dexter M. Keezer, Sanford S. Parker, William F. Butler, John D. Wilson

Robert F. Boger
PUBLISHER

J. G. Johnson, *Business Manager;* R. W. Martin, Jr., *Sales Manager;* Sales Representatives: J. C. Anthony, New York; M. J. Storz, Philadelphia; V. K. Dissette, Cleveland; L. J. Biel, Chicago; W. G. Ashmore, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, St. Louis, Boston and London.

Member of Associated Business Papers, Inc., and the Audit Bureau of Circulations

McGRAW-HILL PUBLISHING CO., Inc., Publishing Office, 99-129 N. Broadway, Albany, N. Y. Return postage guaranteed. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta 3; 621 South Hope St., Los Angeles 14; 738-9 Oliver Building, Pittsburgh 22. JAMES H. McGRAW (1860-1948), Founder; JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to President; J. E. BLACKBURN, Jr., Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year, $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 48, Number 19. Printed in U.S.A. Cable address "McGraw-Hill New York". Member A.B.C. Copyright 1948, McGraw-Hill Publishing Co. Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

a Pair of Champions

the RCA "49" Transmitter "22" Receiver

Engineered to airline standards for

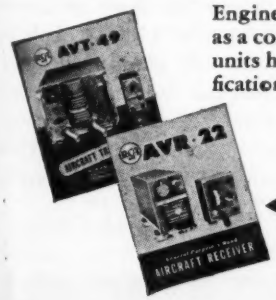
Executive Planes • Cargo Planes • Feeder Airlines

Sportsman Pilots • Aerial Taxi Services • Airline Auxiliary Services

This is it . . . the ultimate answer to your aviation radio requirements. Here is a transmitter of minimum weight *that gets out.* And a receiver of minimum weight that brings in the signals . . . through all sorts of weather. Here, we believe, are two of the finest communication units yet designed and built . . . with no engineering effort spared to make them so.

About the Transmitter AVT-49— This completely self-contained unit delivers 50 watts of power, voice or cw, over a frequency range of 2.85 to 13 mc. It provides automatic band change—with a choice of four independent pre-set, crystal-controlled frequencies. Weight? Only 42½ pounds, completely installed. Size? One short ATR . . . fits any standard airline rack. Available for either 12- or 24-volt operation. Everything remotely controlled.

About the Receiver AVR-22— The AVR-22 provides continuous tuning over the three frequency bands important to commercial aviators—weather and range (150-420 kc), standard broadcast (550-1620 kc), and standard aircraft (2.83- 8.05 mc). In addition, it permits instant switching to any one of four pre-determined crystal-controlled frequencies in the range of 2.83 to 13 mc, plus the airport tower frequency of 278 kc. For accurate homing and position-finding, the AVR-22 may be used with any RCA loop antenna, without modification. There is also provision for interphone communications and side-tone transmission monitoring. Weight? Only 21 pounds. Size? A short one-half ATR . . . fits any standard airline rack. Available for either 12- or 24-volt operation. Complete remote control.



Engineered, styled, and built for operation as a complete system . . . or individually, these units have passed the type tests for CAA certification. Get full information from your RCA Distributor, or from Dept. 9-E, Aviation Section, RCA, Camden, N. J.

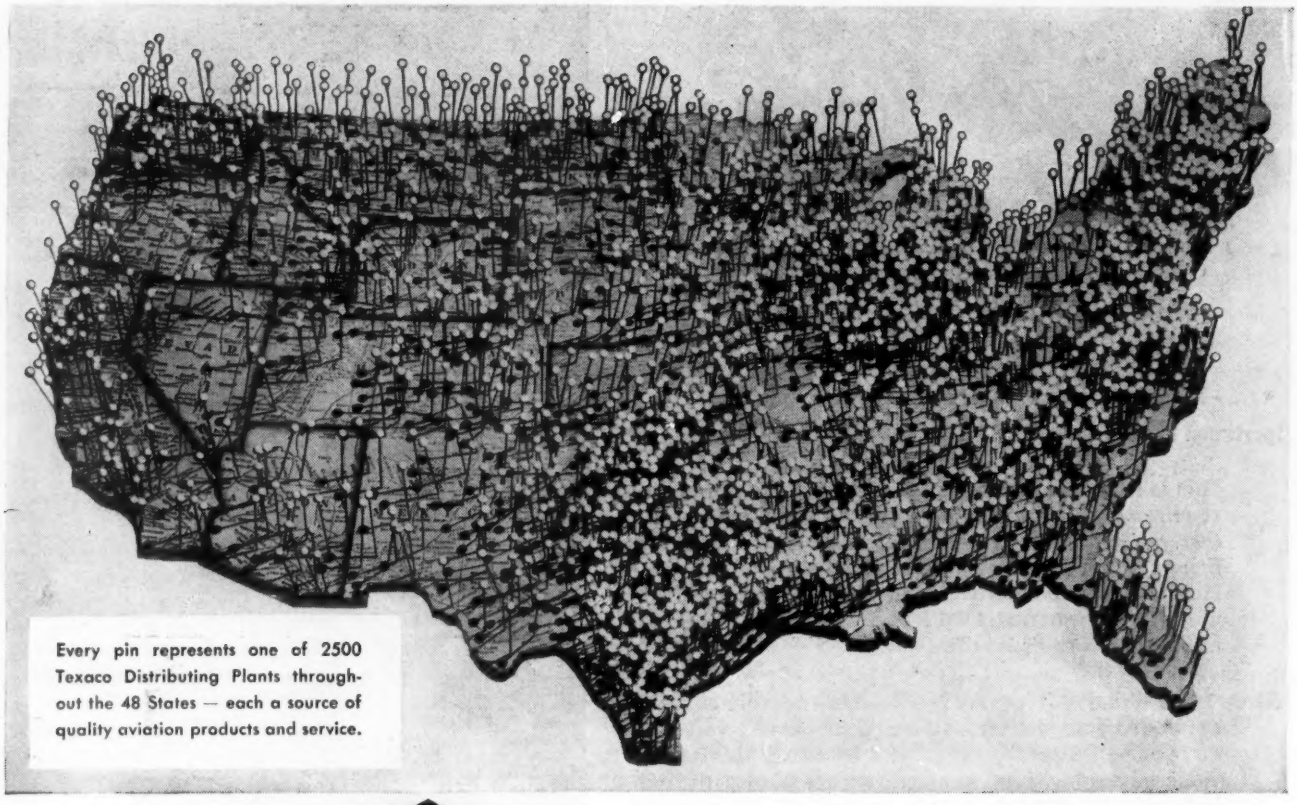
◀ Now ready—two free brochures that fully describe and illustrate the RCA "49" and "22".

AVIATION SECTION

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DIVISION, CAMDEN, N. J.

In Canada: RCA VICTOR Company Limited, Montreal



Every pin represents one of 2500 Texaco Distributing Plants throughout the 48 States — each a source of quality aviation products and service.

HOW THIS SET-UP HELPS YOUR AIRPORT

The Texaco name and trade mark are symbols of quality everywhere

EVERY airport, wherever located, can benefit from Texaco's quality reputation and distribution throughout the 48 States — the country's most complete coverage. When *you* handle Texaco Aviation Products, every flier coming in — no matter where he hails from — is greeted by a familiar confidence-inspiring name.

You get other benefits, too. With Texaco you have the industry's most complete line of aviation lubricants and fuels . . . more that meet A-N specifications than any other brand. And you have in Texaco the top choice of the leaders in aviation . . . airports, aircraft and engine manufacturers, and airlines. In fact —

More revenue airline miles in the U. S. are flown with Texaco Aircraft Engine Oil than with any other brand.

Let the experience of these aviation leaders be your guide. A Texaco Lubrication Engineer will gladly give you full details. Just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

Tune in...Texaco Star Theatre every Wednesday night featuring Gordon MacRae and Evelyn Knight...ABC Network

Report on Air Cargo

The few survivors among scores of uncertificated all-cargo carriers that boomed airfreight into the "big business" category in the postwar period fear they may be losing their grip on the industry they were instrumental in developing. With one or two exceptions, the independents are shaky as a result of past financial losses.

The Air Freight Association, in a recent letter to the Civil Aeronautics Board signed by six presidents of its member carriers, disclosed a financial life expectancy of from zero to six months for some of the companies on the basis of present working capital. Realizing the predicament of the independents, the certificated airlines have made a notable effort to grease the skids under their competitors.

Influential Ally

The independents recently obtained an influential ally in their fight for survival in Thomas K. Finletter, chairman of the President's Air Policy Commission. Certificated airline interests have professed shock that Finletter would permit himself to be retained by an all-cargo line so soon after making his report to the President.

Mercenary considerations were furthest from Finletter's mind when he took up the cudgel for the independent cargo carriers. His major concern is with the national defense aspects of the all-cargo lines' struggle for certification and their battle to obtain the freight forwarders' aid in developing a strong industry. Finletter is backing 100 percent the Air Force's view that maximum stimulation of the air cargo industry is a large factor in the nation's reserve military air strength. He obviously does not believe that the certificated carriers' actions have shown proper regard for maximum stimulation of cargo.

Assistant Secretary of the Air Force Whitney has repeatedly urged CAB to do everything possible to promote air cargo. Military chiefs have disclosed a need for about 4,000 cargo planes of C-54 capacity if the U. S. goes to war. Today, certificated and uncertificated airlines combined have less than 200 cargo DC-4s, DC-3s and C-46s.

CAB Delays

Early in April, CAB refused to grant exemptions to the freight forwarders despite pleas from the all-cargo lines which see the forwarders as a source of extensive new traffic. Three weeks later, a CAB examiner reported that freight forwarders, with their large soliciting organizations, are vital to full development of the air cargo potential. Even after this finding, CAB refused to reconsider its denial of a temporary exemption and insisted its regular slow-motion procedure would be adequate for handling the issues involved in the freight forwarder case.

United Air Lines is now leading a move to have the entire record of the airfreight route case reopened for further hearing. The case was heard between November, 1946, and January, 1947. In March of this year, a CAB examiner recommended certification of five major all-cargo lines. United now claims the record is too old, that new developments should be taken into consideration.

Slick Airways immediately retorted that the certificated airlines have made 18 major moves for delay in the freight route case, freight forwarder case, freight rate case and other cargo proceedings since August, 1946. The cargoline's attorneys indicated that if the record is old and outdated, the situation has been caused to no small extent by the certificated airlines' own stalling maneuvers.

Whether or not delay was United's prime purpose in asking that the freight route case record be reopened, the certificated airline pointed up these significant facts about the cargo industry today:

(1) The certificated lines are providing regular freight service to all points served by the major all-cargo lines;

(2) The certificated lines have constantly increased their cargo volume in the past 18 months;

(3) The independents' estimates of future freight volume made in 1946 have not been realized by a wide margin;

(4) Adverse changes in the financial position of some of the applicants for all-cargo certificates make it doubtful that they are fit and able to conduct a certificated operation.

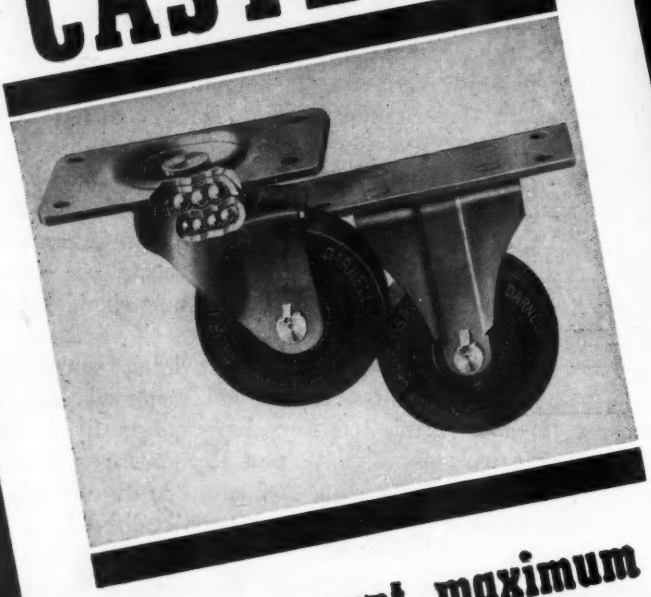
Toting up the evidence, United indicated that the all-cargo carriers generally are now too wobbly to be entrusted with the future of the freight industry.

The Civil Aeronautics Board has already flatly controverted most of the certificated airlines' basic philosophy on airfreight. The passenger airlines had claimed they pioneered airfreight before the war. But CAB stated last month that airfreight transportation is "truly a new product of the postwar period."

Future With Cargo Planes

The certificated airlines have asserted that freight can be given a "free ride" in empty space on their passenger planes. CAB has said this concept is false if any substantial freight volume is to be carried, and Board studies have shown that "the future of airfreight lies more and more with all-cargo planes." The certificated airlines have made every effort to block the admission of freight forwarders to the air cargo industry. A CAB examiner has found conclusive evidence that freight forwarders are vital to air cargo transportation. CAB is faced with the problem of deciding quickly, or not at all, whether to aid the financially-weak all-cargo lines, whose only interest has been airfreight.

DARNELL CASTERS



If you want maximum floor protection, economy and efficiency Demand Darnell Dependability...Made to give an extra long life of satisfactory service . . . . . .

DARNELL CORP. LTD.
LONG BEACH 4 CALIFORNIA
60 WALKER ST. NEW YORK 13, N.Y.
36 N. CLINTON CHICAGO 6 ILL.

Write Today for the new 192 page Darnell Caster and Wheel Manual

NEWS DIGEST

DOMESTIC

General Hoyt S. Vandenberg was sworn in as Air Force chief of staff in the offices of Secretary Symington by Chief Justice Fred M. Vinson. General Carl Spaatz will retire officially July 1 but requested that Vandenberg assume the post immediately while Spaatz makes a European tour.

The nominations of Russell B. Adams to be member of the Civil Aeronautics Board and Delos W. Rentzel to be Civil Aeronautics Administrator were approved by the Senate Interstate and Foreign Commerce Committee. Senate approval appears routine.

James C. Willson, director of Wright Aeronautical Corp., chairman of Irvin Air Chute Co. and one-time president of National Aviation Corp., died May 2 after a long illness, at the age of 62.

FINANCIAL

Douglas Aircraft Co. quoted a net income of $23,862 for 1948 first quarter on $15,251,568 of sales and billings.

North American Aviation, Inc., showed an unaudited net profit of $753,439 for six months, closing Mar. 31. Gross sales were $19,509,533.

Cleveland Graphite Bronze Co. reported net profit of $522,437 or 77 cents per share on sales of $6,657,354.

International Nickel Co. of Canada, Ltd., showed net profit of $33,503,466 for 1947. Capital expenditures were $9,568,796.

Koppers Co. Inc., announced net income for quarter ended Mar. 31 of $1,577,165 on sales totaling $42,452,053.

Air Associates, Inc., reported net loss of $48,518 for quarter ended Mar. 31. Sales for the period amounted to $1,521,671.

FOREIGN

Royal Dutch Airlines (KLM) flew 31,875,000 passenger-miles during 1947 as compared to $22,500,000 the previous year. A total of 76,000 passengers was carried together with $158,400 lb. of mail. General cargo carried totalled 2,090,000 lb.

Brazilian Air Ministry will require the following radio equipment aboard all commercial aircraft flying over the country after July 1: Individual transmitters operating on frequencies of 2870, 6210 and 4220 kc. respectively, receivers covering the 200-400 kc. and 3000-9000 kc. bands and an automatic direction finder.

Canadian Government is chartering planes to fly 10,000 immigrants from the United Kingdom to Canada in the next 12 months.

FOR THE DOUGLAS SKY STREAK---

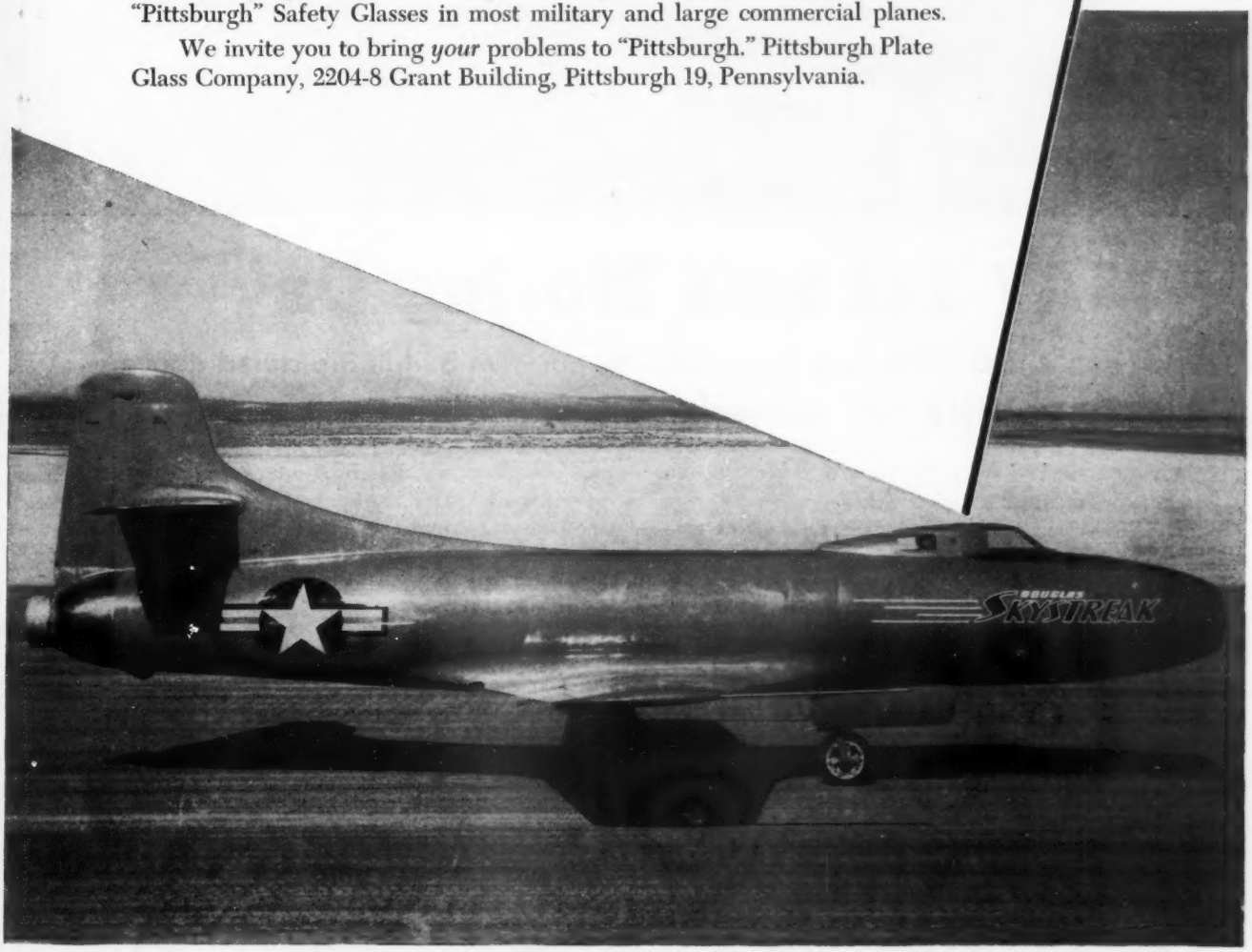
Safety Glass BY "PITTSBURGH"

● In its effort to develop aircraft able to fly at supersonic speeds, at stratospheric heights, the aviation industry is facing new problems in airplane glass and glazing methods. Many of these problems are being solved successfully by the Pittsburgh Plate Glass Company.

By applying proved engineering principles and continuing an aggressive policy of product development, "Pittsburgh" is producing laminated transparent plastics, photographic glasses for aerial use, precision ground bullet-resistant glass for gunsights, and a wide variety of glass and plastic combinations.

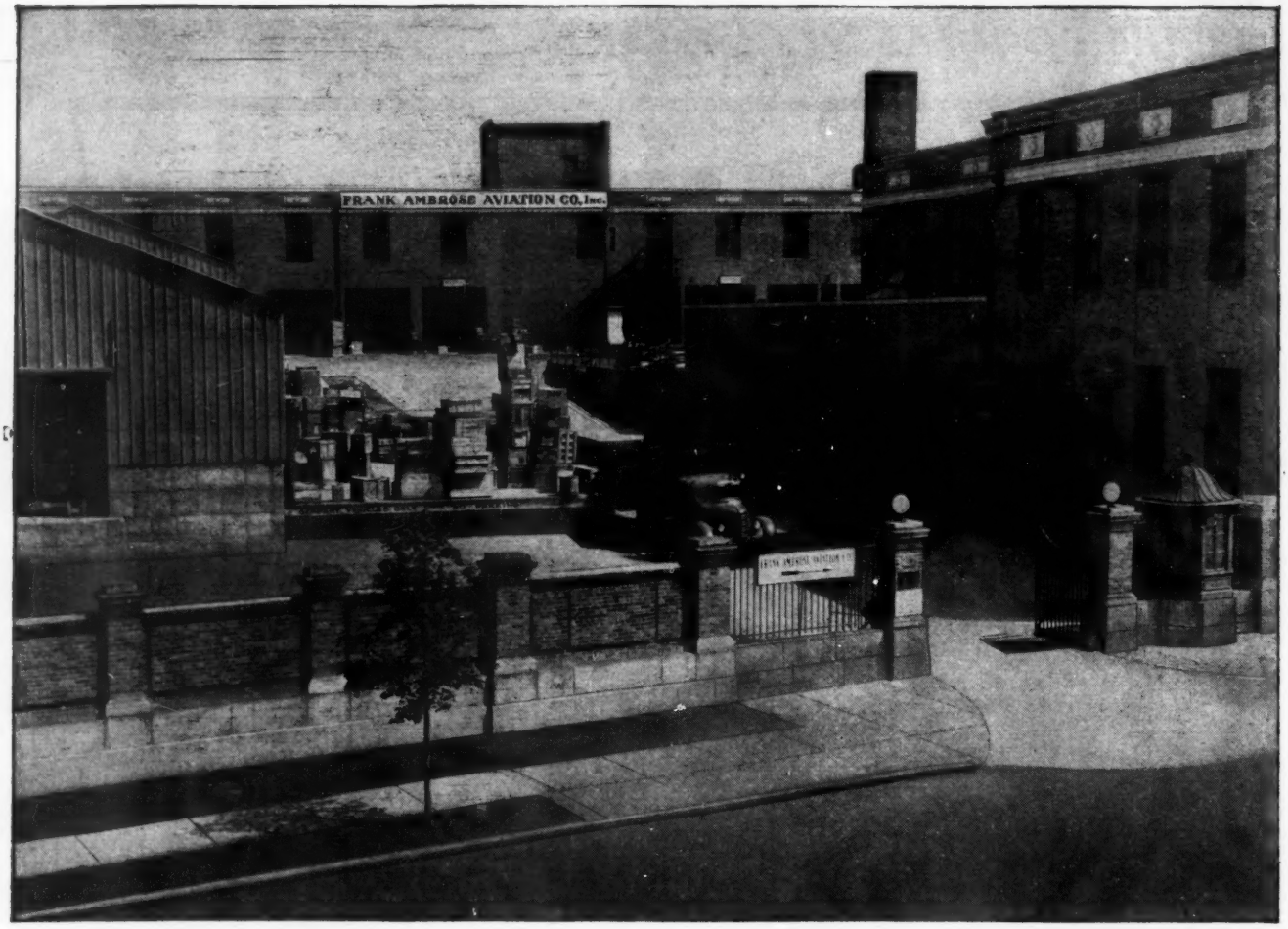
That "Pittsburgh" products are giving satisfactory service where exceptionally high pressures and temperatures prevail, is proved by the use of "Pittsburgh" Safety Glasses in most military and large commercial planes.

We invite you to bring *your* problems to "Pittsburgh." Pittsburgh Plate Glass Company, 2204-8 Grant Building, Pittsburgh 19, Pennsylvania.



PAINTS · GLASS · CHEMICALS · BRUSHES · PLASTICS

PITTSBURGH PLATE GLASS COMPANY



MAY 1st was Moving Day

Here's WHERE we moved — to our own building pictured above.

Here's WHY we moved: *to give you better service!*

Moving is an old story for us. We've been on the move for 25 years: growing in size — extending our services — reaching new customers and making new friends.

Now we are one of the world's largest organizations specializing in the buying and selling of surplus aircraft, aircraft engines, accessories and their components. As manufacturers' distributors and exporters, we also carry selected new materials, such as radio equipment, batteries, tires, and other types of aircraft supplies.

Our staff is trained to give you the kind of service needed: prompt, accurate quotations — expert packing and shipping. All shipments are inspected by C.A.A. designated Aircraft Maintenance Inspectors, and complete facilities are maintained for the testing of accessories. That is why you can be confident that the material shipped you is in good working condition, and that it will reach you safely, whether shipped by air, rail or boat.

Our new catalog — listing a 20 million dollar inventory — will help you when ordering your requirements. Send for your copy today.

EXPORTERS
AIRCRAFT·ENGINES
COMPONENTS

FRANK AMBROSE AVIATION COMPANY

AGENT FOR WAR ASSETS ADMINISTRATION

NEW HEADQUARTERS ADDRESS: 34-17 Lawrence Street, Flushing, L. I., N. Y.

Branch Warehouse: Oakland Municipal Airport, Oakland, Calif.

Agents for Frank Ambrose Aviation (Canada) Ltd., Dorval Airport, Montreal, Canada and Frank Ambrose Aviation, S. A., Panama City, R. P.

Established 1923 ***Cable Address: AIRAMBROSE*** ***U. S. Export License No. 191***

Vol. 48, No. 19

AVIATION WEEK

May 10, 1948

Navy Expanding Plane Strength to 14,500

Build-up to add 3600 craft by 1949, exhaust storage pools a year earlier than planners originally intended.

By ROBERT HOTZ

Naval Aviation will begin an immediate expansion to reach a strength of 14,500 planes by July 1, 1949.

This means addition of 3600 planes to the present Naval air strength of 10,900 planes and will exhaust Navy plane storage pools a full year ahead of earlier estimates. Storage pools will contribute 2400 planes for the expansion with 1200 new planes rolling off production lines.

▶ **Answer to Air Force**—Naval air expansion is apparently the answer to overwhelming Congressional support for the 70-Group Air Force. It allows the Navy to build up to its own version of "parity" with the Air Force without Congressional approval since no procurement funds in addition to those authorized in the Presidential budget are required. Joint Chiefs of Staff have approved the Naval air plan.

By exhausting its aircraft storage pools in the very near future the Navy will be able to come to Congress with a genuine need for a greatly expanded new aircraft procurement program for fiscal 1950. Navy Secretary John Sullivan estimates that an annual 3300 plane production rate will be necessary to maintain the 14,500 plane Navy program. Since storage pools will be exhausted by the end of the next fiscal year the 3300 plane procurement rate would have to become effective in fiscal 1950 if the Navy's plan is to be supported. Navy sources point out that planes now being reconditioned from storage are more modern now than they will be in several years. They should be properly used as soon as possible to clear the decks for the advent of new types within the next two years.

▶ **Procurement Schedule**—Navy procurement scheduled for fiscal 1949 calls for 1535 new planes, with an airframe weight of 11,945,000,000 lb. Bulk of these planes will not be delivered until 1950. This schedule breaks down into 807 fighters; 515 attack planes; 113 patrol planes; 20 transports and 80 helicopters. Of these planes 746 will be jet powered.

Naval procurement officials said that of the 1200 planes to be delivered during fiscal 1949 some 1140 would be paid for out of fiscal 1948 funds with only 60 coming out of fiscal 1949 funds. The remainder of 1475 planes authorized for fiscal 1949 will not be delivered until 1950.

▶ **Plane Types**—Officially types of planes being withdrawn from storage are classified as restricted although all of them are pre-1945 types. Approximately 88 percent of Naval planes now in service fall into this vintage. Curtiss Helldivers, Grumman Avengers, Vought Corsairs and Grumman Hellcats will comprise the bulk of the planes reclaimed from the mothball fleet.

At full 14,500 plane strength the Naval Air Force will consist of 3300 fleet combat planes (compared to 2500 now); 2700 combat types in fleet reserve; 2700 planes for fleet support; 2000 training planes and 3800 in overhaul and modification depots. The combat planes will equip 24 carrier groups for 12 carriers in active service. At present the Navy has only one group available for each of its 12 carriers with one reserve group on each coast.

Navy is now authorized $753,000,000 for aircraft procurement in fiscal 1949. This includes $165,000,000 in cash and $588,000,000 in contract authority. This sum has already been approved by the House and there is no argument over it anticipated in the Senate. Top Navy officials told the Senate Appropriations Committee last week that they did not need additional aircraft procurement funds for fiscal 1949.

First Martin PBM-5A of a production contract for 36 is shown here in its first test flight takeoff at Martin's Baltimore plant. Largest amphibian ever built, this 30-ton giant is a version of the famed wartime Mariner flying boat. It has top speed near 200-mph. mark and a 2000-mile range. Huge craft carries search radar, JATO installation and wide range of equipment.

Howard Lilly

Skystreak Crash

Howard Lilly, NACA test pilot, dies in take-off accident. Exact cause undertermined.

NACA research pilot Howard C. Lilly, 31, and one of the two civilian pilots to have flown faster than the speed of sound, was killed in the crash of a Douglas D-558-I Skystreak. It was first U. S. fatality in the sonic flight research program. Lilly shared with NACA pilot Herbert H. Hoover and USAF Capt. Charles Yaeger the honor of breaching the sonic wall in a rocket-powered plane.

The blood-red, stub-wing Skystreak, which holds the world's official jet speed record of 650 mph., was seen to heel over shortly after leaving the ground at Muroc Air Force Base, Calif., and plunge across the dry lake bed. Preliminary report indicated mechanical failure but only a lengthy examination of the wreckage can determine the exact cause of the accident.

Lilly served in Naval Aviation from Dec. 18, 1941 to Sept. 18, 1942 before joining the NACA Langley Memorial Aeronautical Laboratory as test pilot in October, 1942. He joined the Army Air Forces on Nov. 16, 1944 and was discharged Oct. 1, 1945, resuming his work with the NACA.

He was assigned to the NACA high-speed piloted flight research program at Muroc in August, 1947 preventing his entry in the National Air Races the following month. He had placed ninth in the 1946 Thompson Trophy Race in his special clipped-wing Bell P-63 Kingcobra.

The D-558-I was one of three built under Navy contract for transonic speed flight research. NACA is flying the second plane and a third is being flown by Douglas Aircraft Co. The D-558-I is a part of a broad piloted research program including the Bell XS-1 and XS-2, the Douglas D-558-II Skyrocket and the Northrop XS-4, now nearing completion. First sonic speed fatality was Geoffrey deHavilland, who lost his life in a deHavilland DH-108 swept-wing research craft.

CAB Commerce Argue Air Safety

Conflict between Commerce Department and Civil Aeronautics Board over air safety jurisdiction flared into the open recently before the House Interstate and Foreign Commerce Committee.

In testimony before the committee, Undersecretary of Commerce William C. Foster and CAB Chairman Joseph O'Connell both urged consolidation of air safety functions—now divided between Commerce Department's wing, Civil Aeronautics Administration, and CAB—into a single agency. Their point of conflict: Foster nominated CAA as the single air safety agency; O'Connell, favored CAB.

▶ **Two-Day Session**—The two testified during a two-day session of the committee on legislation carrying out the recommendations of the joint Congressional Aviation Policy Board on reorganization of the government organization for civil aviation. The legislation would lodge all air safety activities now performed by CAA—except air traffic control—in CAB. Board salaries would be boosted from $10,000 to $12,000 a year. The Board's air safety functions would be directed by a Board-appointed $12,000-a-year executive director. CAB would be completely divorced from Commerce Department, even for housekeeping purposes.

A $12,000-a-year air safety director, independent of both CAB and the Commerce Department would be given jurisdiction over air safety investigation, and have authority to recommend air safety measures to CAB. The present CAA would be reduced to an Office of Civil Aviation in the Commerce Department, whose only activities would be administration of the federal airways system and the airport development program. Air Coordinating Committee would be established as a statutory agency and its decisions, arrived at by a majority—instead of a unanimous vote as at present—would be mandatory.

▶ **Ramspeck Testimony**—Air Transport Association's executive vice president, Robert Ramspeck buttressed O'Connell's position. In fact Ramspeck went one step further than O'Connell in urging concentration of air safety functions in CAB: O'Connell proposed that air traffic control functions involving air safety be placed in CAB, but that the operational aspect of air traffic control be left to the proposed office of civil aviation; Ramspeck urged that all air traffic control functions be lodged in CAB.

Air Line Pilot Association's president, David Behncke, urged establishment of an independent air safety board of "five members, but certainly not less than three". Air safety investigation, the ALPA spokesman asserted, "is too far-reaching an activity to be entrusted to one man."

▶ **ACC Issue**—Foster and representatives of the State Department and military establishment opposed statutory establishment of the Air Coordinating Committee. This, it was claimed, would destroy ACC's "flexibility" as a coordinating agency and would give the interdepartmental agency power to enforce its position on the regular government agencies against their will, perhaps by a majority vote of agencies with only a minor interest on a given issue. O'Connell and Ramspeck proposed that statutory establishment of ACC is "not necessary", but interposed no objection to the step. Ramspeck suggested that it might "result in increased effectiveness and speed in coordinating the policy-making functions of the various agencies . . . dealing with aviation".

Foster urged the committee to await the findings of the Commission on the reorganiation of the Executive Agencies, headed by ex-President Herbert Hoover, before making any re-shuffle of aviation agencies as far-reaching as that proposed in the legislation. The commission is scheduled to file its plan for reorganization of the executive branch with Congress next January. Endorsing a gradual funnelling of air safety activities from CAB into CAA, Foster backed a measure, also pending before the committee, authorizing CAB to delegate its air safety functions to CAA. The Commerce under-secretary opposed an independent air safety director, claiming that "the power to recommend should not be divorced from the power to act." O'Connell viewed an independent air safety director as unnecessary but reported that the Board "is not opposed" to a transfer of its investivative activities to such a director. Ramspeck recommended that air safety investigative activities be placed in CAB, but said, likewise, that ATA "would not oppose" the independent director, with authority limited to making investigations and publishing the facts and probable causes. Were the director given power to make recommendations on air safety, Ramspeck said, it would open the way for conflict with CAB.

Cohu Quits TWA

Reportedly will take presidency of Convair. Fight seen over successor.

TWA was shopping for a new president last week, following the resignation of LaMotte T. Cohu, with observers scenting a bitter behind-the-scenes battle between the two financial groups most heavily interested in the carrier.

Cohu's resignation was ascribed to the fact that he had "completed the job I undertook last year." He leaves TWA June 1, and his successor had not been named early last week.

Equitable Life Assurance Society, largest single investor in the company, is reported to have its own candidacy for the presidency. Hughes interests are believed to be supporting John A. Collings, now vice president-operations.

▶ **Back to Manufacturing?**—An official fog surrounded future plans. In face of widespread reports that Cohu would assume the presidency of Consolidated Vultee Aircraft Corp., Floyd B. Odlum, Convair's chairman, says he will be delighted to discuss the matter of coming with Convair with Mr. Cohu."

A spokesman for Odlum amplified the statement only to the extent of saying that Odlum had not talked to Cohu "officially." He pointed out that there was no mention of the Convair presidency in Odlum's statement, and said he could not comment on whether Harry Woodhead, present Convair president, contemplated resigning.

Should Cohu join Convair, he would be returning to the manufacturing industry he left a little more than a year ago.

▶ **TWA Record**—In leaving the airline, Cohu stated "I think progress has been made to the point where TWA is an integrated team." Warren Lee Pierson, TWA board chairman, added, "during the past year the officers and employes of TWA have all worked together to bring the company along to the point where he can look with confidence into the future. . . . Mr. Cohu has been of considerable assistance to TWA."

COHU—From TWA to Convair?

In the 12 months Cohu served as president, TWA revenue increased $21,000,000 or 37 percent. Expenses rose only $13,000,000. Net operating loss for the full year of 1947 was $6,823,730, against $14,924,904 in 1946.

Contract Conflict

CAB and Commerce split in testimony before Congressional group.

Spokesmen for the Commerce Department and the Civil Aeronautics Board have presented conflicting views on the issue of contract carrier regulation to the House Interstate and Foreign Commerce Committee.

Emory T. Nunneley, CAB general counsel, endorsed legislation bringing both domestic and international contract carriers—except those operating aircraft of less than five-passenger size on an infrequent basis—under safety and economic regulation by the Board. Robert Ramspeck, Air Transport Association executive vice president seconded CAB's position. He pointed out that regulation was recommended by the Air Policy Commission and Congressional Aviation Policy Board.

▶ **Commerce Attitude**—H. B. McCoy, director of the Office of Domestic Commerce, dissented. He urged maximum freedom for dynamic growth in the air contract carrier field, and recommended that regulation be limited to fact-finding and safety control. Unfair competition for regulated carriers, he asserted, comes not from bona fide contract carriers but rather from companies performing common carrier service and operating under the guise of contract carriage. To preclude this, McCoy proposed that all air operators be required to register and file with CAB data on the nature of their operations.

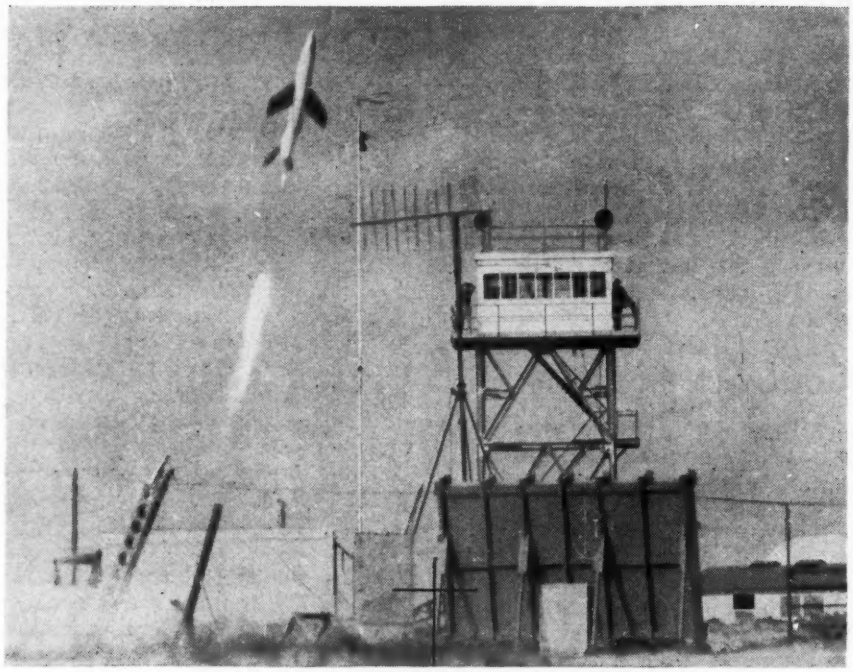
"At present virtually nothing is known concerning the operation of contract carriers, which is one reason why the Department of Commerce doubts the wisdom of full scale economic regulation of their activities," he told the committee.

▶ **Objection Raised**—Langdon P. Marvin, former chairman of the Interdepartmental Air Cargo Priorities Committee, objected to the legislation's provisions bringing international air contract operators under CAB economic control while rates of international scheduled carriers are free from direct CAB control. This, he suggested, would make it possible for a scheduled international carrier to undercut the CAB-fixed rates of a competing contract operator.

Highlights from Nunneley's statement:

- The line between common carriage and non-common carriage is not distinct. "There is a very considerable area of operations concerning which there is room for doubt and controversy as to which side of the common carrier line the operation falls, and hence, whether it is subject to regulation or wholly free from it." Were contract carriers brought under CAB jurisdiction, the Board could provide "the degree" of regulation desirable for contract operators with services bordering on the common carriage field, as well as undisputed contract operators.
- CAB endorses the bill's stipulation giving the Board leeway to exempt "casual" air contractors from its requirement that all contract operators obtain a license (bringing them under economic control) and an operating certificate (bringing them under safety control).
- Contract operations by certificated carriers over routes not covered in their public convenience and necessity certificates should be subject to the same type regulation as the operations of air contractors. Certificated carriers should be barred from performing contract service over their common carrier routes. "The temptation . . . to discriminate in favor of a large shipper by entering into a contract . . . seems evident."
- "Grandfather" licenses should be granted only to operators which have engaged solely in contract operations. The bill's present provisions on "grandfather" licenses discriminate in favor of the scheduled airlines, which would be eligible for a license solely upon showing that at any time during 1947 they engaged in bona fide contract operations. Other carriers would be required to establish that bona fide air contract service was conducted since August, 1947; that since then no common carriage service has been engaged in; and that frequent operations have been carried on between the points to be covered by the license.

This would preclude all of approximately 1500 irregular air carriers and the 12 noncertificated cargo carriers operating under section 292.5 of the Economic Regulations from obtaining "grandfather" licenses since they have been authorized to fly as common carriers. Nunneley said CAB is "not able to discern any reason why participation in common carrier air transportation should foreclose all other companies from grandfather rights if they can show a bona fide contract operation when it does not foreclose the certificated air carriers. . . ."



ROCKET MISSILE LAUNCHING

High-speed photo of NACA rocket-powered supersonic research missile shows swept-wing craft an instant after firing at the NACA Pilotless Aircraft Research Station off the Virginia Capes. Radar tracking determines precise speed of the craft and telemetering equipment contained in the body transmits data to the ground on pressure distribution over swept wing, missile acceleration, temperature, air density and air loads from which exact lift, drag and pitching moment characteristics are determined. This is one of scores of such missiles being used by NACA for supersonic flight research. The missiles are expendable, built of light wood. (NACA photo)

Test Case On Helicopter Air Rules

Washington photographic mission stirs CAA complaint and brings up question of interpretation of Part 60.

By ALEXANDER McSURELY

A helicopter photographic mission for the staid old National Geographic Society, with what was believed to be a bona fide telephone permission from CAA, has resulted in the first helicopter air traffic rules test case in the Washington, D. C., area.

Involved is a CAA interpretive twist on the helicopter liberalizing clause written into Civil Air Regulation Part 60, last October.

▶ **Photo Mission**—Robert Fischel, head of Roto Wings Air Service, Inc., operator of a Bell Model 47B helicopter in the Washington area, had contracted to fly Luis Marsden, color photographer on the National Geographic Magazine staff to make some pictures of the White House, and other points of interest in the Washington area. Fischel asked CAA for a waiver. Request by Fischel for a waiver of standard flight rules over congested areas for the special photographic closeup work, went through channels. Back from First CAA region office in New York, came a "waiver" which was actually no waiver at all.

First CAA region would permit the helicopter to operate at 1000 ft. altitude, with 2000 ft. horizontal separation from any obstacle. National Geographic magazine made one final appeal to Acting Administrator Fred Lee, before cancelling the job. The magazine was referred to Al Koch, assistant administrator in charge of safety regulation. What Koch said by telephone to the magazine, and later said to Fischel, who called him back for verification, is one of the key points in the case. Both Fischel and the magazine understood it was authorization to proceed, with the close-in helicopter photographic flying. Koch, according to CAA information office, has denied that he gave authorization beyond that.

▶ **Two Flights**—Rowland Roelofs, pilot for the helicopter service and Marsden, spent the greater part of a day, in two flights over downtown Washington flying at lower altitudes than 1000 ft. where necessary for closeup pictures. Fischel insists that Roelofs, an experienced helicopter pilot, was handling the machine with due regard to emergency landing, if necessary.

First notification received by the helicopter service from CAA, came indirectly when the Washington newspapers called up for additional information about a CAA press release saying the company was being charged with violation of its waiver.

Reports that White House police had complained to CAA about the flights were denied by Police Captain J. W. Dudley. He said they had no reports of the helicopter flying low around the White House on the day when CAA is citing it. The helicopter made some pictures of the White House from near the Ellipse, at a respectful and lawful distance about a week before.

▶ **Rules Cited**—Part 60 of CAR permits any aircraft to operate in congested areas, with minimums of 1000 ft. above an obstacle, and 2000 ft. horizontal separation. Sub-section 60.107 B provides further: "Helicopters may be flown at less than the minimum prescribed herein if such operations are conducted without hazard to persons or property on the surface and in accordance with sub-section A." This provides that all aircraft shall be operated at altitudes which will permit emergency landings without hazard to persons or property in event of power failure.

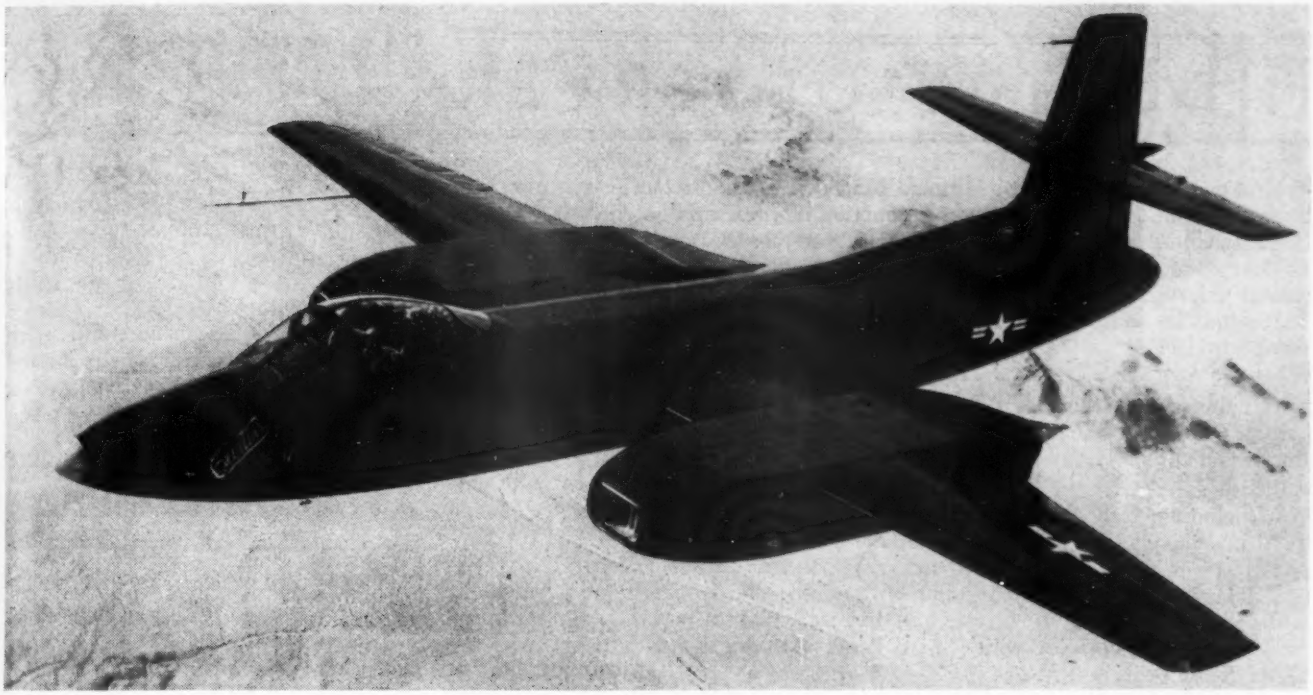
A note following re-emphasizes the special flight characteristics of the helicopter "which can accomplish an emergency landing within a relatively small space." And it also re-emphasizes that the pilot is required to fly "with due regard to places where an emergency landing can be made with safety, and to maintain an altitude along the flight path from which such an emergency landing can be effected at any time."

CAA officials said charges of violation of the terms of the waiver were being prepared against Roelofs and the helicopter service.

The case will be watched with keen interest by all present and potential helicopter operators. If CAA by restrictive interpretations nullifies the liberalization of Part 60, for helicopters, the usefulness of the helicopter in city areas will be curtailed, and it will be relegated largely to agricultural crop-dusting and similar duties.

CAA spokesman say their stand is to protect the public from helicopter crashes in congested areas which might set back aviation and helicopters in particular.

Just how far CAA is justified in going in hampering helicopter operation on this basis, presumably will be a matter for eventual court decision, and perhaps later revision of the easily-stretched Part 60.



XP-87 CLOSEUP

Midair closeup of Curtiss XP-87 all-weather fighter over Mohave desert provides striking proof of its giant size by comparison with helmeted heads of Test Pilot Lee Miller and Flight Engineer Robert Park. Four-engined fighter has completed more than a dozen flights of increasing speed, duration and altitude. Curtiss-Wright Airplane Division is tooling up machinery, in preparation for quantity production of the huge all weather fighter at its Columbus, Ohio, plant.

Runway Snow Blamed For Boston Accident

Excessive snow accumulation on the runway, which resulted in loss of directional control of the aircraft, probably caused the Eastern Air Lines Constellation accident during a landing run at Logan Airport, Boston, last Jan. 21.

In issuing its findings, CAB said a contributing factor to the mishap was the lack of precaution exercised by Eastern's station manager, the Civil Aeronautics Administration's operations inspector and the airport management in determining that the conditions of the runways were adequate for safe aircraft landing. The Board asserted the accident also pointed up the need for better passenger evacuation facilities.

▶ **Runway Condition**—Snowbanks between four and six feet high lined the runway between 30 and 40 ft. from the left edge when the Model 649 Constellation landed. Long, narrow drifts of snow projected from the base of the bank approximately 20 ft. into the cleared area of the runway, and about one-half inch of newly fallen snow covered the runway.

Shortly after a normal touchdown, the Constellation's left landing gear struck snow drifts on the left side of the runway. The snow retarded the left wheels and caused the plane to skid to the left into the snowbank.

▶ **Plane Burns**—The crash resulted in failure of the right landing gear and nose gear. Fire broke out in the vicinity of No. 3 and No. 4 engines and soon spread to the fuselage, which was largely destroyed. None of the crew of five or of the 20 passengers was injured by the crash or the fire, but five of the occupants were hurt while leaving the plane.

CAB stated that although the evacuation was orderly, the accident "forcibly points toward the need for developing more suitable passenger evacuation facilities." The Board noted that the crew made no attempt to use any emergency evacuation equipment with which the plane was equipped, but added that "there is considerable question as to whether the use of the rope would have minimized injuries during the evacuation, and there is no doubt that use of the ladder would have materially increased the time required for evacuation."

(The five occupants were injured when they jumped from the rear cabin exit, which was about 15 ft. above the ground.)

▶ **Lighting Problem**—In the darkness after the pre-dawn accident, the placards describing the location and operation of evacuation equipment and emergency doors were not legible. Thus the passengers were unable to open the cabin entrance door or any of the emergency doors. They were unaware that emergency evacuation equipment was carried aboard the plane.

CAB said the accident indicates the necessity for independent auxiliary lighting facilities to illuminate such areas as emergency exits, emergency evacuation equipment, first aid equipment, and survival craft equipment in the event of electrical system failure.

PAA, Panagra Rebuffed In Move Against Braniff

Efforts by Pan American Airways and Panagra to block inauguration of Braniff Airways' service to South America early next month have been rebuffed (AVIATION WEEK May 3).

Following an oral argument, the Civil Aeronautics Board last week dismissed petitions asking suspension of Braniff's Latin American operations. The Board refused to order hearings requested by PAA and Panagra, declaring that "institution of such proceedings would cast a dark shadow across the certificate already lawfully issued to Braniff and would seriously hamper and prejudice the inauguration and development of service previously found to be in the national interest.

CAB admitted that substantial mail payments—higher than those originally anticipated—will be required for Braniff's new service to South America. But it noted that Braniff's operation is far from unique in this respect and said the prospect of increased costs does not constitute sufficient cause to institute the proceedings sought by PAA and Panagra.

INDUSTRY OBSERVER

► **Air Force has ordered 20 additional Fairchild C-82 "Packet" cargo planes at a cost of about $5,000,000 to carry production at the Fairchild Aircraft Division, Hagerstown, Md., until work on the improved C-119 version begins this fall. C-119 production was originally scheduled to begin in June but delays have moved this up. Fairchild has already delivered 200 model C-82s to the Air Force and the additional 20 will replace service losses since the Packet entered service in 1945.**

► Pratt & Whitney Aircraft Division, United Aircraft Corp., does not expect to start deliveries on the J-42-P-2 "Nene" turbojet engine until October at the earliest. The engines are scheduled for installation in the Grumman F9F-3 production "Panther" Navy fighter.

► **British are readying a number of new turboprop engines for flight tests this year including: Rolls-Royce Avon 1; Armstrong Siddeley Manba 11, producing 1270 hp. and 385 lb. static thrust; Bristol Janus 1, originally designed for helicopter power, developing 500 hp. and 65 lb. thrust; Bristol Phoebus 1, of 2540 hp.; deHavilland H3, producing 450 hp. and 130 lb. thrust; Napier Nymph 1, with 500 hp. and 95 lb. thrust; and the Rolls-Royce Tweed and Armstrong-Siddeley Cobra, both of which were being considered for the Saunders-Roe SR-45 flying boat.**

► North American P-82 "Twin Mustang" fighters are "backing up" in the supply line to the Air Force due to engine difficulties. Dozens of the craft remain unaccepted due to valve trouble on the Allison V-1710 engines. Procured for long-range escort purposes, the double-fuselage craft are the only fighter types now in production capable of providing bomber escort for distances over 1000 miles.

► **Tucker Corp. has hired Secundo Campini, famed Italian jet propulsion expert and inventor of the Caproni-Campini series of jet aircraft, to head its jet propulsion division. Tucker has also purchased the rights to Campini's extensive jet propulsion patents.**

► Art Chester is readying a new racer, "Whimpy" for the 1948 National Air Races. The new craft will feature a "Y" tail replacing the familiar "V" tail used on his famed "Swee'pea."

► **Wright Aeronautical Corp. has received a $3,909,680 contract for the production of Cyclone 18 engines for Lockheed Constellation transports. The 2500 hp. model will be installed in TWA versions and, presumably, in the new C-121 Air Force military version.**

► United Air Lines estimates that a helicopter mail service in the Chicago area would cost $88.12 per hour or about $1.59 per mile. Largest single item is general overhead (including ground service, landing fees, lighting installation, etc.) of $37.86 per hour and $19.83 per hour in depreciation. Direct operating cost is estimated at $4.22 per hour.

► **Breakdown of commercial helicopter operations, as represented by Armstrong-Flint Co. in Los Angeles, shows 51 percent of flying in power line patrol, 19 percent pilot training, 13 percent fire fighting and 5 percent in agricultural work such as dusting and spraying. Charges for these services range from $50 an hour for routine power line patrol to $100 an hour for spraying, seeding and fertilizing operations. For fruit tree spraying, the peculiar airflow beneath a helicopter proves ideal with the air flowing downward, outward, then upward again beneath the trees.**

► Concensus of helicopter builders and operators is that the ideal mass-market design must be a four-place, single-rotor type powered capable of cruising at 100 mph. at 75 percent power, hover at 8000 ft., have a 1200 ft. per min. rate-of-climb, a ceiling of 18,000 ft., a range of 800 miles and sell for less than $10,000.

► **Trans-Canada Airlines has announced receipt of sufficient DC-4M North Star aircraft from Canadair Ltd., Montreal, to be able to start domestic transcontinental service with these aircraft on June 1 instead of July 1, as previously planned. The DC-4M will be used on the Montreal-Toronto-Winnipeg-Vancouver service.**

► Hughes Aircraft Co. wishes that USAF would make up its mind about what it wants to do with the ME-262 twin jet Nazi fighter rebuilt by Hughes and supposedly wanted urgently for flight tests to learn performance data. Russia is building improved version of the ME-262 in quantity. Rebuilt plane was completed by Hughes two months ago, and scheduled for immediate testing at Muroc Air Base. Today, the plane still sits at Hughes' Culver City, Calif., factory.

UAW Martin Winner

The winner and still bargaining agent at Glenn L. Martin Co.'s Middle River (Md.) plant is CIO's United Automobile Workers. The CIO's hand was raised by the National Labor Relations board this week over the defeated but still fighting International Association of Machinists (Ind.). Final score: for UAW-CIO, 3076; for IAM, 2007; for neither, 1057.

IAM asked for a recount and more time to file objections. NLRB denied an extension of time; reserved ruling on the recount.

AVIATION CALENDAR

May 12-15—Aviation Writers Association, 10th Annual Convention, New York City.

May 16—Annual Cotton Carnival Air Show, Memphis, Tenn.

May 17—ICAO facilitation division, Geneva.

May 17—ICAO North Atlantic Regional Meeting, Paris.

May 18-20—AIA board of governors meeting, Williamsburgh, Va.

May 19—Air Commerce Day at Miami, part of World Trade Week observance.

May 20—ICAO European-Mediterranean regional meeting, Paris.

May 23—Seventh annual national meeting, Society of Aeronautical Weight Engineers, Columbus, Ohio.

May 27-28—Third Annual Michigan Aeronautic Conference, Lansing, Mich.

May 29-30—New England Seaplane Regatta (AOPA), Lake Winnipesaukee, N. H.

May 30—American Legion National Air Show, Berry Field, Nashville, Tenn.

June 1—ICAO second assembly, Palais Des National, Geneva, Switzerland.

June 1-6—Second annual all woman air show, Miami.

June 6-11—SAE Summer Meeting, French Lick Springs Hotel, French Lick, Ind.

June 8-10—Airport Management Conference, College Station, Tex.

June 11-13—Spring Air Cruise sponsored by Pennsylvania Aviation Trades Association, Williamsport, Pa.

June 14-15—Airlines Medical Directors Association, annual meeting, Royal York Hotel, Toronto.

June 15-17—Airport management conference, College Station, Tex.

June 16-18—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.

June 17-18—Aviation Distributors and Manufacturers Association, Grand Hotel, Mackinac Island, Mich.

June 21-25—1948 Annual meeting, American Society for Testing Materials, Detroit.

June 27-30—Annual convention, National Aeronautic Association, Hotel Radison, Minneapolis, Minn.

July 2-9—National Air Tour Week, sponsored by United Pilots & Mechanics Association.

July 2-9—Second National Air Tour Week, United Pilots and Mechanics Association.

July 4-5—Annual National Air Show, Port Columbus, Columbus, Ohio.

July 14-15—Institute of Aeronautical Sciences' annual summer meeting and dinner, Hotel Ambassador, Los Angeles.

July 17-18—National Trading Day and All-Dixie Air Show, Chattanooga, Tenn.

Boeing Strike—Who Will Meet?

Negotiations at stand-still as company president says local union no longer is collective bargaining agent.

The Boeing Airplane Co. and the Aeronautical Mechanics Union appear to be prepared for a long strike, with the company refusing to meet with any union officials except representatives of the Grand Lodge of the International Association of Machinists, and the Grand Lodge representatives refusing to meet with company officials unless officers of the District Lodge be allowed to participate.

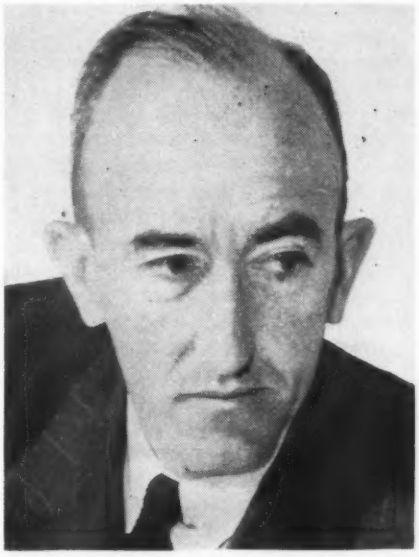
Mayor William F. Devin has named a three-man committee to investigate the strike and seek a basis for reopening negotiations but its prospects are not too bright.

IAM granted strike sanction to the District Lodge—after a delay (AVIATION WEEK, May 3)—"on the basis of the conduct and actions of the company subsequent to the beginning of the strike," the union said in a formal statement.

▶**Labor Law Angle**—Sanction of the strike by IAM was granted in confused circumstances two days after the arrival in Seattle of a committee representing the executive council of IAM, and six days after the strike began. On April 22, Boeing President William M. Allen asked IAM President Harvey W. Brown whether the Grand Lodge sanctioned the strike. Brown replied it had not. Allen again wired Brown, explaining the company no longer considered the District Lodge to be a bargaining agent. Brown suggested he send a committee to Seattle, and Allen accepted.

This would indicate Boeing's belief that the strike had voided its contract. Yet, IAM announced that it was backing the strikers after the three-man committee made its investigation in Seattle. Washington information is that IAM delayed sanction until the committee had determined that Boeing believes no contract exists. Otherwise, under the Taft-Hartley Act, the company might sue the international union for damages resulting from a strike in violation of contract.

▶**Maneuvers**—The committee scheduled a meeting with William M. Allen, Boeing president, but Allen refused to attend when he learned that the committee had arranged to have Harold J. Gibson, president of District Lodge 751, participate in the conference.



BOEING'S ALLEN—No contract, no employes.

Allen's refusal to attend this conference, and also to meet with District Lodge representatives and federal conciliators, was based on the company's position that the strike "is in violation of contract and of Section 8-D, National Labor Relations Act" and that "those on strike are no longer employes of the company or Lodge 751 a collective bargaining agency."

The union declared that "Mr. Allen stated that he will not meet in conference in which representatives of District Lodge 751 participate, and that he does not intend to negotiate with the committee of our executive council on the issues which caused the strike. Mr. Allen requested to meet with the executive council committee only for the purpose of discussing other matters which in his opinion were related to the strike. The executive council committee informed Mr. Allen that no constructive results could come from the type of conference he proposed."

▶**Sanction Results**—Strike sanction means that the 14,700 union members will receive strike benefits of about $10 a week each.

The union is asking for a 30 cents an hour wage increase, retention of seniority provisions and eight paid holidays a year.

After announcement of the sanction, the company issued a statement in which it said "the fact remains that the strike has never been authorized by the membership of the union. The fact also remains that the strike is illegal and in violation of the union's contracts. Insofar as the company is concerned, the only effect of the sanction is to make the International a party to an unauthorized and illegal strike."

Picket lines have had little effect on non-union personnel.

▶**Insurance Goes On**—Although the company said it no longer considered the strikers as its employes, it announced it would keep approximately $15,000,000 worth of group life insurance in effect during the month of May on union members. The insurance normally is paid jointly by the company and its employes. The employes' portion would have been deducted on the paycheck of May 14. However, the company will advance the necessary sums to the insurance company on that date.

Meanwhile, effect of the Boeing strike was felt strongly at Northrop Aircraft Co. last week when 80 production workers were laid off to curtail by 50 percent the production rate on manufacture of B-50 bomber flaps.

Changes on Pioneer

Extensive revision of size and configuration details of Northrop Aircraft's three-engine "Pioneer" transport is under way as the company prepares for production of 23 units ordered by Air Forces.

The military version will be identified as the "Raider C-125," and will represent a third boost in horsepower of the basic design. Military power will be provided by three Wright R-1820 engines rated at 1200 hp. The Pioneer first was equipped with 600-hp. Pratt & Whitney engines when the prototype's gross load stood at 22,000 lb. Subsequently change was made to the 800-hp. Wright 957-C-BA-1 engine, and designed gross weight was raised to 25,000 lb.

With the new engines and dimensional changes, the airplane gross weight will be raised "considerably" above 25,000 lb.

Key design changes include: lengthening of Wingspan 2 ft. to 87 ft.; lengthening of fuselage 5 ft. to 70 ft. to provide 1820 cu. ft. of cargo space; redesign of fuselage configuration from rounded cross-section to a nearly rectangular section; replacement of fuselage side loading door by 9 ft. wide underfuselage ramp to receive wheeled vehicles as well as cargo.

The at-rest position of the airplane on main landing gear wheels and tail wheel will be retained, and a hydraulic jack installed in the tail section to raise the fuselage to level position for lowering of the loading ramp.

No Production Labor Shortage

Pools of experienced workers available in aircraft production, employment service census survey shows.

Availability of labor to man the expanded aircraft production anticipated by the new military program looks good despite predictions of government experts in Washington that the job level in July will hit 61,000,000, breaking last summer's record of 60,078,000.

Chief reason for this favorable outlook is that postwar cutback in aircraft building left a good-sized pool of experienced aircraft workers from which to draw. West Coast has the highest ratio of unemployment in the country. According to Ewan Clague, BLS commissioner, there are seven persons claiming unemployment compensation on the Pacific Coast for every 100 persons covered by unemployment insurance. This is double the national average of 3.5.

► **Shifts Seen**—If the labor is not available from existing supply, it is the view of Robert C. Goodwin, director of the U. S. Employment Service, that many workers will shift into an industry like aircraft from other industries. Such shifting might be voluntary or it might be forced through the shifting of critical materials into aircraft and reducing the number of jobs in other industries.

Check by uses of the manpower situation in eight key aircraft centers discloses a very loose labor market in all of them except Columbus, O., where a tight labor market is reported developing. At present, there is an even balance in Columbus between demand and supply.

Labor surpluses are reported in Los Angeles, San Diego, Seattle, Wichita, Fort Worth, Hartford, Conn., and New York City.

In Los Angeles, unemployment has been rising since last November. USES finds the labor supply is adequate to fill all anticipated labor needs except certain highly technical positions. One factor turned up in Los Angeles may be indicative of what is happening in other areas where a loose labor market gives employers a chance to be more choosey in who they hire. Employers are reluctant to hire men under 25 years of age because of their possible loss if Congress puts through a draft law.

► **Demands Rise**—In San Diego, aircraft employment is beginning to pick up because of new parts contracts, but much of the new hiring is confined to experienced workers. A demand was also developing for aircraft assemblers. Unemployed in San Diego include large numbers of aircraft non-production as well as assembly workers. Over-supply of aeronautical engineers exists.

In Seattle, there is still a substantial surplus of labor, although employment has exceeded the moderate gain anticipated earlier this year. USES foresees no problem in meeting the labor needs of expansion expected at Boeing, except in one occupation. There is a shortage of drop hammermen.

In Wichita, there has been considerable hiring, mostly for retooling to handle contracts for model changes. Half the 1500 increase in jobs expected by fall have already been filled without recruiting outside Wichita except for top skills. Local labor has shown considerable interest in aircraft jobs. The area expects it can handle any aircraft expansion up to an increase of 7000 or 8000 jobs, which is not currently anticipated.

In Hartford, employment has declined steadily while new aircraft orders are anticipated. If large orders come through, a shortage could develop. But thus far the labor supply is considered more than adequate to meet all known requirements.

In Fort Worth, there has been a surplus of aircraft manpower except for aerodynamists and draftsmen. New York City has had a long-standing heavy surplus of labor. It is expected that any foreseeable aircraft expansion could easily be recruited from the pool of unemployed.

Fairchild Books New Business

Fairchild Engine & Airplane Corp. will go into production this year on a $23,000,000 order from the Air Force for 37 C-119BS.

This, together with other military business, pushed Fairchild's backlog to $37,400,000 by Mar. 31, 1948, according to the company's annual report. Of this amount, 78.4 percent was military, .4 percent commercial, and 21.2 percent military research and development.

► **C-82 Order Complete in 1948**—USAF's order for 20 additional C-82s will keep Fairchild's production lines rolling until operations on the C-119 begin in September. (Page 16). By the end of 1947, 169 C-82s had been delivered. Remainder of the original order of 200 will be completed in 1948.

In addition to its order for the C-119, Fairchild has been awarded contracts for the construction of a detachable fuselage plane, the C-120. Also on its books is development of small constant-speed propellers to be used with low and medium horsepower engines.

► **Work For Navy**—The company's pilotless aircraft division is manufacturing the Lark for the Navy, as well as carrying on work on the design and study of a new supersonic missile and a guidance system for pilotless aircraft.

The personal plane division delivered 45 F-24 four-placers during the year. Development and flight test operations still are being conducted on the new F-47 all-metal four-place planes.

► **C-82 Sales**—Net income for 1947 was $1,642,412 compared with $962,048 for 1946. Sales totaled $38,123,867—approximately two-thirds of this amount was attributed to the C-82.

No part of the reserve for war and readjustment costs and contingencies, which amounted to $2,184,095 at the end of 1946, was used during the year, so this amount was restored to earned surplus.

Aerocar Passes Tests

Tests conducted in the University of Washington wind tunnel indicate the Aerocar, combination automobile and airplane, will be "a good flying machine," according to Moulton B. Taylor, president and general manager of Aerocar, Inc., Longview, Wash. (AVIATION WEEK, May 3).

"We have been most fortunate in our original engineering, and we were unable to find any obvious flaws or difficulties in the tests," Taylor said. "None of the troubles that have appeared in so many new machines have been found, and the flight characteristics of the Aerocar equal or exceed our expectations."

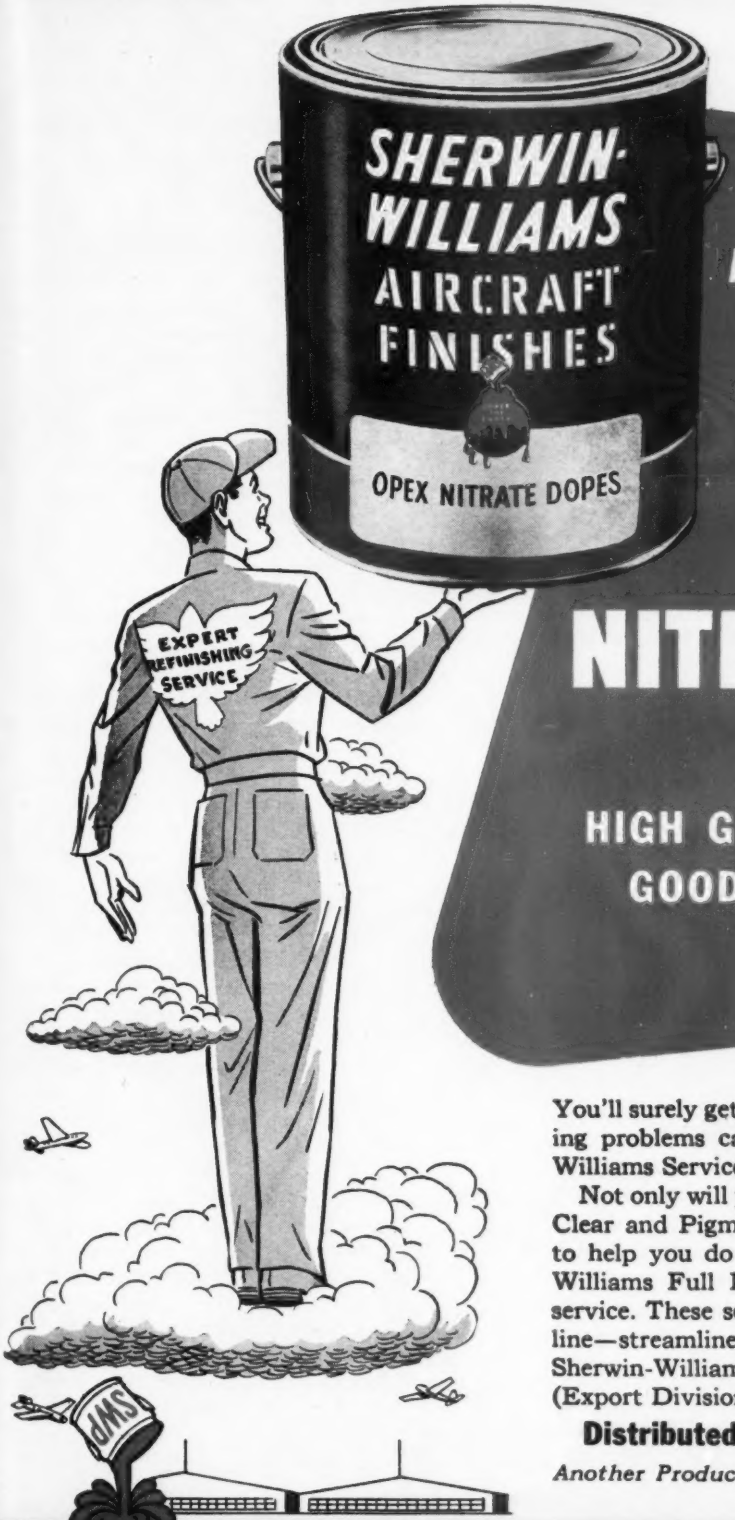
The firm has started construction of a full-size road prototype of the automobile portion of the Aerocar. This unit will be completed as soon as possible so that road tests, cooling problems, steering, etc., can be investigated.

The wind tunnel tests were conducted with a 4:1 scale model. The craft is expected to have a cruising speed of 100 miles an hour in the air and up to 60 miles an hour on the ground. It is equipped with wings which fold back along the fuselage, the conversion operation being performed by turning a small hand crank which moves the wings into position.

The Aerocar is designed to carry two passengers while in flight and three on the ground, with the same controls for flying and driving. Wings, tail assembly and the propeller, mounted on the rear of the fuselage, are removable.

Retail cost of the craft is estimated at between $3000 and $4000.

WANT TO FEEL LIKE THIS?



LIGHTEN YOUR JOB WITH SHERWIN-WILLIAMS' AMAZING

OPEX NITRATE DOPES

NOW!

HIGH GLOSS! FAST BUILDING!
GOOD FLOW! LOW COST!
FAST DRYING!

You'll surely get a lift out of knowing that all your refinishing problems can be solved once you see your Sherwin-Williams Service Man.

Not only will you be using those good, fast-handling Opex Clear and Pigmented Nitrate Dopes—specially developed to help you do the job easier, better—but the Sherwin-Williams Full Line of Aircraft Finishes will be at your service. These selected products result in a more compact line—streamlined for quick action . . . highest quality! The Sherwin-Williams Co., Aircraft Division, Cleveland 1, Ohio. (Export Division, Newark, N. J.)

Distributed by Pacific Airmotive Corporation

Another Product of Sherwin-Williams Industrial Research

SHERWIN-WILLIAMS
AIRCRAFT FINISHES

Lawrence A. Clousing, head engineering test pilot at the NACA Ames Aeronautical Laboratory since 1943, performed the extensive high speed flight tests on which this article is based. He received the 1947 Octave Chanute Award of the Institute of the Aeronautical Sciences for work in this field, so vital to aviation progress.

Three Rules to Guide Test Pilots

Extensive experience obtained in flying at near-sonic speeds furnishes basis for NACA safety principles.

By LAWRENCE A. CLOUSING

Special flight studies at high subsonic Mach numbers have led to the establishment of valuable general precautionary rules for high-speed test flying.

Basis of the new formulations are experience and data obtained by NACA test pilots in a variety of high-speed craft.

In research flights at high speeds, safety has more than usual significance. It means not only the safe return of pilot and plane, but the acquisition of data which was the aim of the flight.

Experience has demonstrated that observance of these rules can greatly increase the safety of flight test near sonic speeds:

▶ **Precautionary Rule 1**—*Initial flight tests at high subsonic Mach values should be carried out at an altitude at which excessive air loads cannot result even though the airplane is stalled.*

Adherence to this condition is advisable because at high Mach numbers inadvertent pitching and even stalling may occur. An example can be cited from flight tests of a typically high-speed fighter.

During normal recovery from a dive at high Mach value, the plane pitched up abruptly, even though pilot had exerted no corresponding change in control force. The fact that the craft was being tested at 27,000 ft. prevented excessive air loads from resulting.

In another case, the plane began an unexpected pitching oscillation of considerable intensity while in a straight and steady dive.

Considering the effect of altitude on load factor, it seems only reasonable to conduct tests in which unexpected maneuvers may occur, at altitudes that hold the maximum possible load factor to a safe limit.

Based on a representative assumption of wing loading and maximum lift coefficient for a typical fighter, a load factor of about 19 is aerodynamically possible at sea level and a Mach number of 0.85, while a load factor of less than six is possible for the same assumptions at an altitude of 27,000 ft.

▶ **Precautionary Rule 2**—*At Mach numbers above those at which local velocities on the wing exceed the local speed of sound, flight tests at progressively higher Mach values should be undertaken only in small increments, and only after exploring accelerated flight characteristics at lower numbers.*

Experience has shown that at some number above the critical Mach value of the wing, flight at higher Mach numbers may be either structurally unsafe, uncontrollable or both.

Tests made in accordance with Rule 2 permit an extrapolation of data obtained at lower Mach numbers and accelerations at which the airplane may be safely operated from either the structural or stability-and-control point of view.

▶ **Buffet Boundary**—Even though Rule 1 is observed, it is possible to have structural troubles due to buffeting. One purpose of Rule 2 is to avoid these troubles.

At certain limits of Mach number and load factor, buffeting begins on any airplane. These limits are called buffet boundaries. It is possible to exceed the boundary to some variable extent, but it should be borne in mind that structural failure may occur even though allowable load factor is not exceeded.

NACA flight research has shown that such failures may be due to buffeting and other compressibility effects, and not to inadequate structural design. In maneuvers at lower altitudes, structural failure did not occur in the craft investigated, although higher-than-allowable load factors were imposed.

Extensive operation of a plane while it is buffeting is usually undesirable, and safe operation up to allowable load factors is generally possible, provided the buffet boundary is not exceeded. For these reasons the buffet boundary generally has been recognized as a limiting condition for safe operation, supplementing the boundaries otherwise limiting operation.

However, flight tests show that it is possible for the buffet boundary to be exceeded for limited periods without structural failure occurring. Hence, such a boundary is unduly conservative if used to define the limiting accelerations for test purposes.

▶ **Limit Considerations**—A "tolerable limit of buffeting," based on a test pilot's opinion, has been used as a guide in NACA research. There is no engineering method by means of which a safe, tolerable limit of buffeting may be established. Reliance in the establishment of a satisfactory limit is almost entirely dependent upon the test pilot's experience and discretion.

▶ **Maneuver Limitations**—Considering Rule 2 in regard to stability and control, it may be that above the critical Mach number of the wing compressibility effects on the wing, tail or both, may make it impossible to maneuver the plane much beyond the buffet boundary, even though it is structurally safe to do so.

Investigation of control force and movement in a fighter up to about Mach 0.76 has shown two possible limitations to maneuvering at high speeds. The elevator movement required to maneuver this particular plane

at a given acceleration increased markedly. This pointed to the possibility that at some higher Mach number the amount of longitudinal control available from the elevator would be so limited that a pull-out from a dive could not be made.

The elevator control force to maneuver the plane also rose markedly, indicating that the force per unit of acceleration may become so large that pilot cannot pull out of a dive.

▶ **Nosing-Down Tendency** — Even in level flight, some planes require up-elevator rather than down-elevator movement with further increase in Mach number beyond some high subsonic value. This characteristic is apparent to the pilot as a nosing-down tendency.

When such condition exists, tests should be carried to higher Mach numbers only with great caution. For if this tendency becomes worse as the flight Mach number is increased, and if the tests are carried to a Mach value at which more than full-up elevator is required for straight flight, the craft would be uncontrollable.

During investigation of two fighters, it was observed that although the elevator angle indicated development of a nosing-down tendency, the control force gave no indication of it. It is possible in such case that the nosing-down tendency may go unnoticed until the pilot is in difficulty, since his principal warning of this dangerous condition comes from the force on the control rather than its position.

However, in the general case, the tendency is indicated by both elevator angle and control force.

▶ **Wing-Flow Study**—Another trend of control changes has been recorded in wing-flow investigations. In this technique small models are mounted in the region of high-speed flow over a wing, where data can be recorded at speeds considerably higher than flight speed. These tests have shown that as Mach number is increased, a nosing-down tendency of relatively mild degree may first develop, followed by a nosing-up, and then by an abrupt and large nosing-down.

▶ **Acceleration Factor Considered**—Another hazard, other than an uncontrollable dive, is possible as a result of the nosing-down tendency and increase in stick-force gradient at high Mach numbers, particularly if the trim tab or adjustable stabilizer is not handled with discretion.

Although at the highest Mach number of fighter flight tests, an acceleration factor of only 3 could be obtained with 50 lb. pull on the elevator control, at a somewhat lower Mach number, an acceleration factor of about 10 could be obtained if the 50-lb. pull were maintained.

High Mach Number Flight Test Check List

Because of the many factors to be considered in test flying near sonic Mach numbers, it may be helpful to make use of this type of check list. Prior to flight, the figures could be supplied on the basis of the best information available at that time, and then as flight tests progress, the figures could be continually revised on the basis of data obtained:

1. Based on Mach number and allowable load factor, the minimum altitude for flight tests is ..... ft.
2. Critical Mach number of the wing is .....
3. Mach number at which buffeting starts at 1 G is ..... at altitude of ..... ft.
4. Mach number of the tolerable limit of buffeting in level flight is ..... at altitude of ..... ft.
5. Mach number at which elevator angle or control force required for level flight changes abruptly with increase in Mach value is ..... at altitude of ..... ft.
6. Mach number and acceleration at which elevator control force gradient becomes dangerously small are ..... and ..... G units at altitude of ..... ft.
7. Flutter was noted at the following: Mach number .....; altitude .....; and acceleration .....
8. Significant longitudinal, lateral, or directional oscillations or abrupt erratic motions occurred at Mach number ..... at altitude of ..... ft.

This condition could lead to inadvertent stalling of the airplane if the flight Mach number were reduced rapidly. If at the higher Mach number the trimming device were adjusted to keep the airplane in level flight (an acceleration factor of 1), a tremendous push would be required to keep the craft from exceeding its limit load factor as Mach number decreased. If the trimming device is relatively ineffective at the higher Mach numbers, the effect described would be worse.

▶ **Stick-Force Gradient Change**—There have been cases at high speeds where very large decreases of stick-force gradient occurred with increasing acceleration without increase in Mach number. When such a change occurs, it is plain that inadvertent pitching-up of the plane is possible.

By following Rule 2, buffet boundaries and longitudinal control may be explored judiciously. Information on the buffeting and control can be plotted from the flight experience, and extrapolations can be made which will help to predict characteristics of slightly higher Mach numbers.

As tests progress, the extrapolations can be continually revised and a limit Mach number for tests, from the standpoint of buffeting and longitudinal control, can be estimated.

However, in view of the control reversals mentioned previously extreme caution must be taken in making an extrapolation over too large a range of Mach number, as the trends may reverse themselves suddenly.

▶ **Precautionary Rule 3**—*There should be accurate recording and analysis of essential data as tests progress.* (Corollary of Rule 2.)

Data which must be recorded are: Indicated airspeed, altitude, normal acceleration and elevator angle. Many other items, such as elevator control force, may be profitably recorded. (Obviously, recording of information is essential in tests of the kind discussed, since the pilot could not make adequate notes from indicating instruments.)

The pilot's indicating instruments for Mach number, altitude and acceleration should be properly calibrated and substantially free of lag to avoid confusion in applying conclusions from the data recorded. Danger of not having comparable recorded and indicated data should be apparent in test flying of such a nature that changes of Mach number as small as 0.01 may make the difference between safe and unsafe operating conditions.

▶ **Dive Recovery**—To demonstrate an airplane to the limits of Mach number at which safe flight is possible, some boundary defining the tolerable limit of buffeting is necessary, because limiting the performance of the airplane on the basis of the boundary at which buffeting starts is too conservative.

For example, in one fighter which was tested, it would not be possible to recover from a dive at a Mach number higher than 0.764 without exceeding the buffet boundary (since 0.764 is the value at which buffeting begins on this airplane at a load factor of 1).

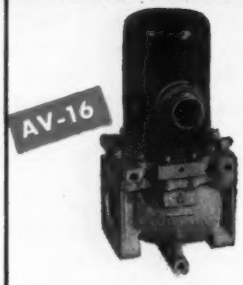
With another airplane, the limit on the same basis would be 0.794. With each craft, however, these Mach numbers have been safely exceeded.

▶ **Procedure Evolved**—The general procedure followed by the author has been evolved through experience and influenced by two partial structural failures. These occurred at approximately the plane's limit load factor and at or above the wing's critical Mach number. These two values differ with every plane, but they will be known to the pilot.

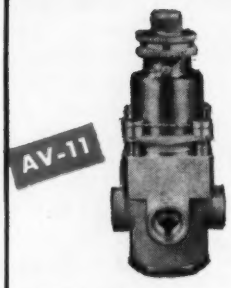
Hence, it is suggested that the tolerable limit will lie somewhere between the boundary where buffeting begins and the limit load factor of the airplane. The tolerable limit will be conditioned by the approach to limit load factor and nature and severity of the buffeting and motions experienced with each particular craft.

▶ **Other Buffeting Factors**—Not only do fatigue characteristics of materials place an indeterminate limit on the length of time that operation with severe, rapidly reversing stresses is safe, but parts that may be affected by buffeting vary with type of plane and con-

SPECIFY GENERAL CONTROLS
hi-g* valves for aircraft
AUTOMATIC PRESSURE, TEMPERATURE AND FLOW CONTROLS

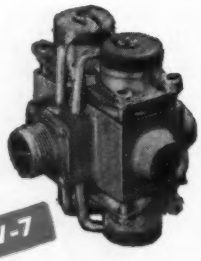


Electric motor valve, suitable for fuel, hydraulic fluid and lubricating oil shut-off. High flows at low pressure drop, explosion-proof motor and switch cover.



3-way Electro-Magnetic valve used for distribution of fluid flow or for "feed in" and "exhausting" fluid from a cylinder, piston or vessel.

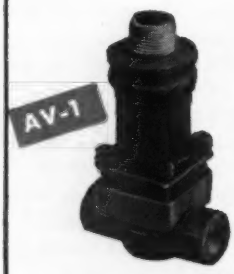
Same as AV-1 except is normally open type. For control of various fluids, oil, water, gasoline, air, etc.



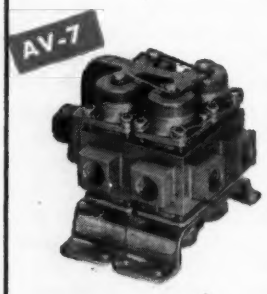
Four-way selector type control—operating pressure up to 3000 P.S.I. for control of fluid pressure operated cylinders.

Electro-Magnetic valve for medium and high pressure applications. Controls hydraulic oils, fuels, lubricating oils, water, etc. 50 P.S.I. to 3000 P.S.I. operating pressure.

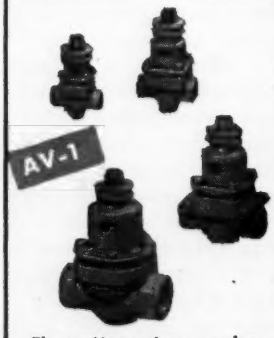
Temperature modulating control—providing fully automatic electro-hydraulic operation for control of engine coolant and lubricating oil.



Normally closed type Electro-Magnetic valve—for control of all types of fluid, gasoline, air, water, hydraulic fluids or oils, anti-icing fluids, etc.



Electro-Magnetic Double-Four Way selector type valve for control of fluid pressure operated cylinders.



Electro-Magnetic type valves with various magnet sizes, full ported or restricted ports, for all types of fluid, gasoline, air, water, oils, etc.

For complete specifications and engineering data, request new Catalog.

*hi-g TRADEMARK 36-2

GENERAL CONTROLS
Manufacturers of Automatic Pressure, Temperature & Flow Controls
FACTORY BRANCHES: BIRMINGHAM (3), BOSTON (16), CHICAGO (5), CLEVELAND (15), DALLAS (2), DENVER (10), DETROIT (8), GLENDALE (1), HOUSTON (2), KANSAS CITY (2), NEW YORK (17), PHILADELPHIA (40) PITTSBURGH (22), SAN FRANCISCO (7), SEATTLE (1) • DISTRIBUTORS IN PRINCIPAL CITIES

ditions attendant to the operation.

Buffeting may occur on wings, tail surfaces, controls, and other parts. Buffeting of one part may be more serious from the standpoint of structural failure than buffeting of another part. The part most likely to fail first will vary from plane to plane.

▶ **Transonic Flutter**—An impression of buffeting is sometimes given by flutter. In high-speed flight, a type called transonic flutter has recently appeared. This may occur with only one degree of mechanical or structural freedom and appears to result from time delays due to near-sonic velocities in the airflow.

Transonic flutter has occurred for short periods of time without causing structural failure, but did cause partial failure of an aileron in at least one instance. With relatively rigid control systems having little backlash, amplitude of transonic flutter generally has been small; this type of flutter therefore has been referred to as "buzz."

Adherence to the second part of Rule 2 is important in exploring transonic flutter because it may occur at lower Mach numbers as the lift coefficient is increased. Mach number and frequency are functions of the characteristics of each airplane, so no precise limit can be given.

In some cases, the severity of the oscillations may become greater as the Mach number and lift coefficient are increased. Any sudden change in the floating angles of control surfaces as the Mach number is increased above the critical should be regarded as a warning that conditions for transonic flutter are being approached. This warning may not always appear, nor does it always indicate the imminence of transonic flutter.

▶ **Tail Surface Buffeting**—This has caused structural failure, in one case, at the plane's limit load factor and the critical Mach number of the wing.

Severe buffeting may result from tail surfaces being in the turbulent wake from the wing. Such a condition is likely to occur at Mach numbers above the critical of the wing and at high lift coefficients because of the spread and increased turbulence of wing wake.

It would be wise for the test pilot to pay particular attention to the extent of buffeting of horizontal tail surfaces when he exceeds the buffet boundary.

▶ **Wing Shock-Stall**—It is possible that at high Mach numbers the wing may shock-stall unevenly, causing, in addition to buffeting, erratic and abrupt rolling motions. Amount of hazard from such motion is not immediately apparent, but it creates decided apprehension in the pilot's mind.

Rolling oscillations of this type occurred during test flights in a fighter plane, and were sufficient to convince the pilot of the inadvisability of proceed-

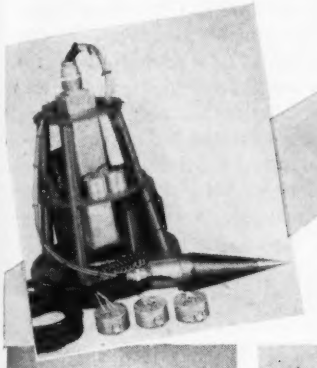
TO MEASURE . . . TO INDICATE . . . TO WARN . . . AT A DISTANCE

Bendix Pacific Engineered TELEMETERING

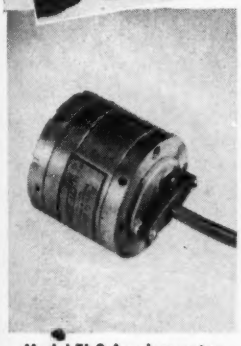
★ Flight Tested Components and Assemblies

★ Experienced Application Engineering

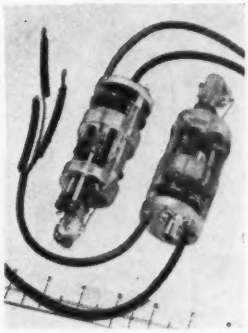
★ Component Field Testing



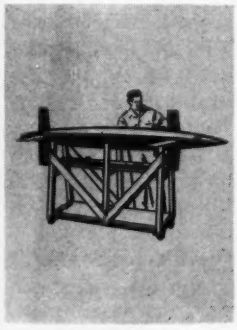
Complete 6-channel Telemetering System ready to install in vehicle.



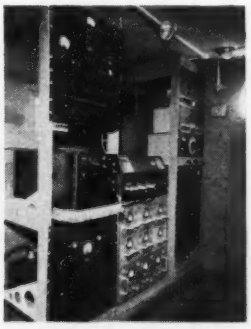
Model TI-2 Accelerometer



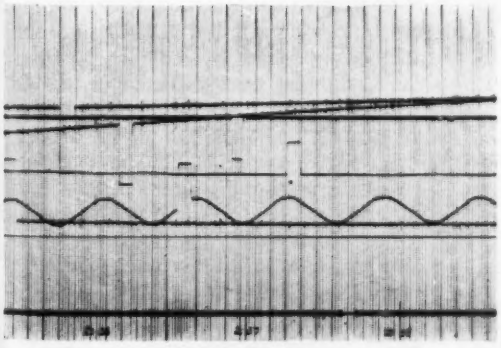
TT-2 80 mc. f.m. transmitter



Installation Engineering



Mobile Receiving/Recording Station



Data Reduction

Bendix Pacific offers the aircraft industry the fully tested and approved FM/FM Subminiature Telemetering System.

Bendix-Pacific Telemetering is a practical engineering tool with reliability and performance that has been demonstrated in over 600 channels fired in nine different vehicles during the past two years. This unmatched record of experience has been accomplished with better than 90% performance on Army and Navy missiles and pilotless planes.

The complete Telemetering Service offered by Bendix-Pacific includes:

1. **Application engineering to adapt the Bendix-Pacific System to each specific problem.**
2. **Standard and special FM/FM Subminiature components and assemblies.**
3. **Installation and calibration services.**
4. **Aircraft and missile antenna design and radiation analysis.**
5. **Flight testing, providing all ground station facilities and reduction and analysis of data.**

Indicative of the engineering leadership which Bendix-Pacific has attained is the fact that a typical six-channel telemetering system complete with power supply weighs 12 pounds and occupies only 120 cubic inches. Inquiries from qualified companies and agencies for complete engineering data are invited.

PRODUCT OF Bendix AVIATION CORPORATION

Pacific Division

Bendix Aviation Corporation

NORTH HOLLYWOOD, CALIF.

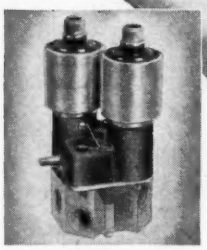
East Coast Offices: 475 Fifth Ave., New York 17, N.Y.

The story of experience, gained through the war years, has been told many, many times. But the manufacturer who today goes on to design better equipment and develop specific applications, is a little more rare. The success story of Adel is based on *precision* manufacture of Hydraulic Equipment. This policy of producing only the *best* in material and design is of tangible value to the Aircraft Industry today. For Adel provides a complete line of Precision Hydraulic Equipment for the planes now in production, and those being planned for tomorrow.

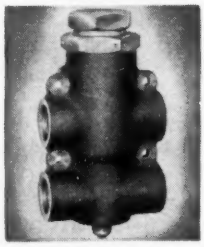
The ADEL Line of "3000 PSI" Precision Hydraulic Equipment

Shown here are a few "3000 PSI" items in Adel's broad line of Hydraulic Equipment. This equipment offers greater power with substantial savings in weight. Its simple design provides ready servicing and quick assembly. Constructed of the highest quality materials, all parts are precisely made and carefully inspected. Built for long life and *dependable operation.*

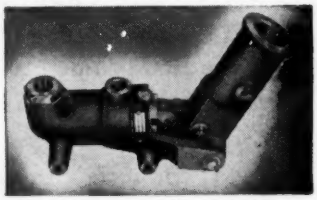
Adel Engineers are prepared to solve your specific application problems. Write today, for complete information on the Adel line of Precision Hydraulic Equipment for Aircraft.



Selector Valve, No. 16476—3000 psi, Solenoid-Operated with manual over-ride.



Relief Valve, No. 12108—3000 psi, ½" relief valve.



Hand Pump, No. 12044—3000 psi, double acting hand pump.

ADEL

General catalog is available upon letterhead request. Please address inquiries to 10727 Van Owen Street, Burbank, California.

ADEL PRECISION PRODUCTS CORP.

BURBANK, CALIFORNIA ★ HUNTINGTON, WEST VIRGINIA

Manufacturers of: **Aircraft Hydraulic Systems • Aircraft Valves • Line Supports Clips & Blocks • Halfco Self-Aligning Bearings • Marine & Industrial ISOdraulic Remote Controls • Industrial Hydraulic Equipment • Industrial Valves.**

ing to a higher Mach number. On some airplanes, unsymmetrical shock or other factors cause yawing motions which are equally disagreeable.

Buffeting also has occurred because of canopies and external stores, such as fuel tanks or bombs. With external stores, buffeting has, in some cases, resulted in failure of the mount and loss of the stores.

▶ **Level vs. Dive Test Flying**—Some interesting points may be considered in regard to safety of test flying at high speeds by diving as compared with level, or nearly level, flight.

In level flight, if difficulty is experienced, it is possible to return to lower Mach numbers fairly quickly by merely decreasing power. In a dive, to decrease speed it is necessary to increase the lift coefficient unless suitable brakes are available. If buffeting is encountered in a dive, recovery generally involves increased buffeting as the lift is increased.

As previously mentioned, experience has shown that safe flight is possible with acceleration above that at which buffeting starts, and the tolerable limit of buffeting falls off much more slowly with increasing Mach number than the boundary at which buffeting starts.

Obviously, a higher Mach number may be attained for a given amount of power if the airplane is dived rather than flown in level flight. By making use of gravity rather than additional power, the weight and complication of an airplane while undergoing tests at a given Mach number may be less.

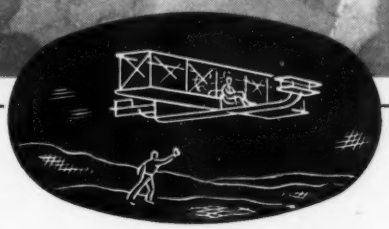
The decreased weight allows higher factors of structural safety and increased safety in takeoff and landing. Elimination of some of the power plants otherwise required reduces troubles and hazards inherent in the use of all power plants and may render unnecessary the use of untried means of augmenting thrust at the same time untried realms of sonic flight are being explored.

Some of the power plants which might be used in airplanes in level flight at high Mach numbers are of such a nature as to make it difficult to follow Rule 2. Rockets, for example, permit thrust to be varied only in large increments—each rocket is either on or off.

It should be emphasized that whether made in dives or in level flight, initial tests near sonic Mach numbers should not be carried out below the minimum altitudes specified by Rule 1. In dives the shallowest practicable angle should be used for each Mach number. Hence dives must be started at high altitudes.

Based on experience gained largely by utilizing the diving technique and adhering to the foregoing analysis, it is believed that test flying near sonic Mach numbers may be nearly as safe in dives as in level flight, provided the precautionary rules outlined are strictly followed.

FROM ORVILLE WRIGHT TO THE TRUCULENT TURTLE



The true story of the progress made by the American aviation industry can be found in the record books:

★ **DECEMBER 17, 1903.** *Orville Wright completed first successful mechanical aeroplane flight, Kitty Hawk, N. C. Distance: 4 miles.*

★ **SEPTEMBER 29—OCTOBER 1, 1946.** *U. S. Navy crew completed flight from Perth, Australia to Columbus, Ohio. Distance: 11,235.6 miles.*

Look to the records, too, for the story of OSTUCO contributions to the continued progress of American aviation. Pioneers in this highly specialized field, OSTUCO engineers and craftsmen produce the finest in aviation tubing, creating a tradition of continuous research, sound design and precision manufacture that has earned an enviable reputation. Favorable strength-without-weight characteristics, an amazingly low percentage of rejects and a record of on-time deliveries has made OSTUCO Aviation Tubing—built to U. S. Army and U. S. Navy specifications—the continuing choice, now, as always, of leading U. S. Aircraft manufacturers.

OSTUCO Aviation Tubing has contributed to the advancement of the American aviation industry and to the continued development and improvement of aircraft produced by these progressive manufacturers:

Aeronca Aircraft Corp.
Beech Aircraft Corporation
Bell Aircraft Corp.
Bellanca Aircraft Corp.
Boeing Aircraft Co.
Cessna Aircraft Co.
Chance Vought Aircraft Div.
Consolidated Vultee Aircraft Corp.
Curtiss-Wright Corp.
Douglas Aircraft Co., Inc.
Fairchild Aircraft Div.
Funk Aircraft Co.
Globe Corp., Aircraft Div.
Goodyear Aircraft Corp.
Grumman Aircraft Engr. Corp.
Kellett Aircraft Corp.
Lockheed Aircraft Co.
Luscombe Airplane Co.
McDonald Aircraft Corp.
The Glenn L. Martin Co.
North American Aviation, Inc.
Northrop Aircraft, Inc.
Piasecki Helicopter Corp.
Piper Aircraft Corp.
Republic Aviation Corp.
Sikorsky Aircraft Div.
Spartan Aircraft Co.
Texas Engineering & Mfg. Co., Inc.
The Waco Aircraft Co.

THE OHIO SEAMLESS TUBE COMPANY

Plant and General Offices: **SHELBY, OHIO**

SALES OFFICES: CHICAGO, Civic Opera Bldg., 20 North Wacker Dr. • CLEVELAND, 1328 Citizens' Bldg. • DETROIT, 2857 E. Grand Blvd. • HOUSTON, 927 A M & M Bldg. • LOS ANGELES, Suite 200-170 So. Beverly Drive, Beverly Hills • MOLINE, 225 Fifth Avenue Bldg. NEW YORK, 70 East 45th St. • PHILADELPHIA, 1413 Packard Bldg., 15th & Chestnut • ST. LOUIS, 1230 North Main St. • SEATTLE, 3205 Smith Tower • SYRACUSE, 501 Roberts Ave. CANADIAN REPRESENTATIVE: Railway & Power Corp., Ltd., HAMILTON, MONTREAL, NORANDA, NORTH BAY, TORONTO, VANCOUVER and WINNIPEG.

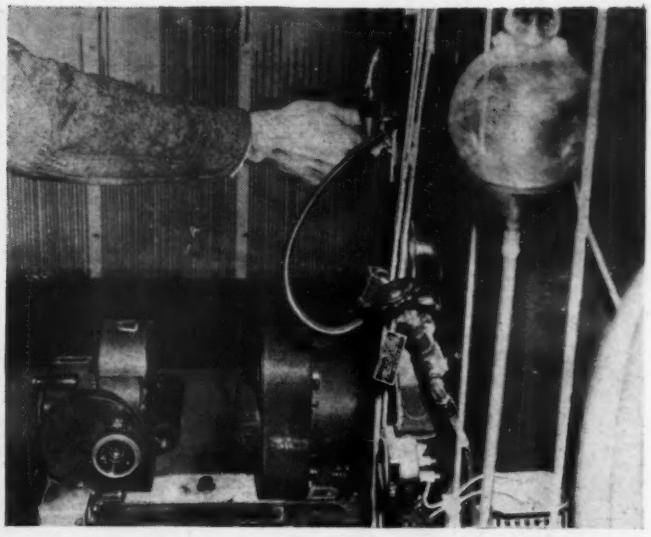
"MY CONFIDENCE in Esso Aviation Products goes hand in hand with my confidence in the Esso Standard Oil Company. Whenever and wherever I fly over the country I look for Esso ... for high-quality aviation fuels and lubricants."

Marion L. Crist, Private Flyer
Consulting Sanitary Engineer

"SINCE 1939 we've used only Esso Aviation Products in our planes and at both our operations. Like hundreds of other airport operators, we've found Esso satisfies flyers ... and keeps them coming back."

Edward Garbez and Claude Holbert, Owners and Operators of Central Airport and Central Flying Service, North Little Rock, Arkansas

CONSTANT RESEARCH
in America's largest petroleum laboratories assures the high quality of all Esso Products. The special aircraft engine test cell, where all types of aviation products are tested, is just one of the modern steps used to bring you Esso Aviation Products ... the fuels and lubricants flyers can depend on!



Left: Operator scans instruments in "flight box," bearing temperatures being his principal concern. High-speed cameras are mounted in front of box. Right: Closeup of camera installation for recording manometer readings each half-second of test run. Mechanical counter located on panel enables data to be correlated with photos obtained at other instrument panels used in Turbodyne test.

Instrumentation for Engine Testing

New experimental technique developed to get data on Turbodyne permits taking simultaneous readings from nearly 500 points.

A new experimental engine-testing technique showing promise of saving many millions of dollars in perfecting new power plants has just been disclosed.

A development of Northrop-Hendy Co., its importance became apparent when testing the company's "Turbodyne" gas turbine engine.

▶**Low Development Cost** – Tom Quayle, general manager of Northrop-Hendy, an affiliate of Northrop Aircraft, Inc., and Joshua Hendy Iron Works, told a representative of AVIATION WEEK:

"The Turbodyne project, under Air Force sponsorship, represents, at this time, an expenditure of approximately $3,000,000. The best information we can obtain indicates that this is about one-third of what would be considered the normal industry cost of laboratory development and testing, to the point of presenting a production model of an engine of comparable power."

▶**Technique Matches Funds**–Key to this apparent economy is the laboratory testing philosophy applied to the Turbodyne project at its inception in 1945.

Under economic pressure of comparatively limited military financing, it evolved into a "mass instrumentation testing" technique.

A "war baby," Northrop-Hendy was launched without benefit of more than a shadow of the production and laboratory facilities possessed by long-established engine manufacturers.

At the outset, it had neither the funds nor equipment to expend on testing of its new power plant in a conventional series of experimental runs to obtain, in successive steps, data on component strengths, vibration, power delivery, fuel consumption, pressures, and temperatures.

▶**Single Test Cell**–The result was a new concept–crowding into a single test cell the equipment needed to gather all data required in development of the Turbodyne.

As a further and radical step, the data would be gathered simultaneously.

To Arthur J. Phelan, chief of power plant research, goes much of the credit for original conception of the basic plan.

It called for one of the most thoroughly instrumented laboratory units ever designed, and an original method of coordinating activities of engineers supervising the recording of widely diversified information.

▶**Extensive, Simultaneous Readings**–During a Turbodyne run, almost 500 visual and recorded temperature and pressure readings, and other data pertinent to the engine's performance, are taken simultaneously. These include:

Some 380 pressure takeoffs around the engine shell at compressor and turbine stages and multiple burners.

About 100 temperature takeoffs in successive combustion areas and at bearing surfaces.

Horizontal, vertical and axial vibration data gathered from four locations and translated by a Western Electric Mirragraph recorder employing 12 electronic vibration channels.

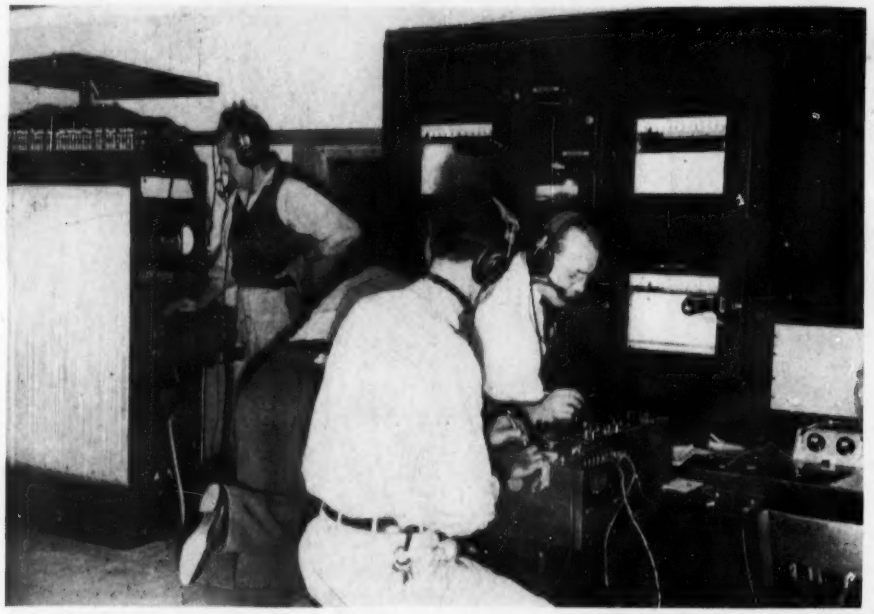
Coordination of multiple readings received from various camera recordings is achieved by time and number. All cameras are synchronized to Veeder-Root counters synchronized to a master counter and clock. Time and number of photos are uniform for all instrument readings, and pictures can be taken at varying frequencies up to two per second.

In a "flight box," similar to those used in recording experimental test flight data, are instruments which produce, for camera recording, data on power output, rpm., fuel and oil pressures, bearing temperatures, and rate of fuel flow.

▶**Manned by Ten**–Simultaneous operation of such a battery of instruments, crowded into a 15-ft. room adjoining a 12-ft. control room, both separated only by concrete walls and shatterproof glass from an engine that might let go at any instant with bomb blast effect, would seem to demand the attention of an extensive complement of engineers.

Northrop-Hendy does it with 10 men.

During a test run they are frequently



During Northrop-Hendy Turbodyne test run, technician observes manometer panel, while three others operate temperature recording equipment used in the check.

Engineer stationed at electronic equipment which records vibration data in milliseconds. Oscilloscope provides visual data on vibration conditions, and this information is relayed by observer to run-coordinator via throat microphone and earphone.

crowded shoulder-to-shoulder in the tiny rooms.

▶ **Operational Coordination** — By the simple expedient of an airplane intercommunication system utilizing heavy soundproofed earphones and throat microphones, the engineers are alerted for a run, start their recording instruments, and relay through a test coordinator any irregular readings which might call for a shutdown of the engine.

In the small control room are stationed a Turbodyne operator, who handles the engine's performance controls; an observer covering the temperature and oil flows; the test coordinator, usually the chief of the company's aerodynamics section; and an assistant chief of aerodynamics.

In the adjoining instrumentation room, two engineers supervise manometer panels, one handles temperature recorders, and one operates vibration recorders. This allocation is varied according to test conditions.

In the test cell yard below are stationed two engineers as overall performance observers.

▶ **Technique's Efficiency** — General Manager Quayle reports:

"The technique has produced extraordinarily accurate data, and our percentage of 'misses' on recorded data compares favorably with the results of engine laboratories gathering the same information by repeated runs over much longer periods of time.

"It is mechanically impossible to obtain constantly a completely successful functioning of all instruments which are involved; but I would say that at no time do we fall below 80 percent of a perfect score."

▶ **Time Economy**—Examples of time saved in test runs are indicative of the value of the technique:

In ten minutes, vibration data is obtained which, if charted manually, normally would probably require the full time work of two engineers working for one week.

In a single 30-min. run, the test crew, using mass instrumentation facilities, gathers data which probably could not be obtained in less than eight or more hours by less advanced methods.

▶ **Reports Same Day**—By automatically recording all data in a correlated manner, Northrop-Hendy engineers are able to obtain complete test reports the same day that a run has been made.

There is no waiting, sometimes for days, for technicians to transcribe detailed notes and engage in lengthy interpretations to produce the full picture of what happened during a run.

▶ **Damage Spotted**—An additional advantage of integrated mass instrumentation is that it provides a constant damage survey of the engine undergoing a proving run.

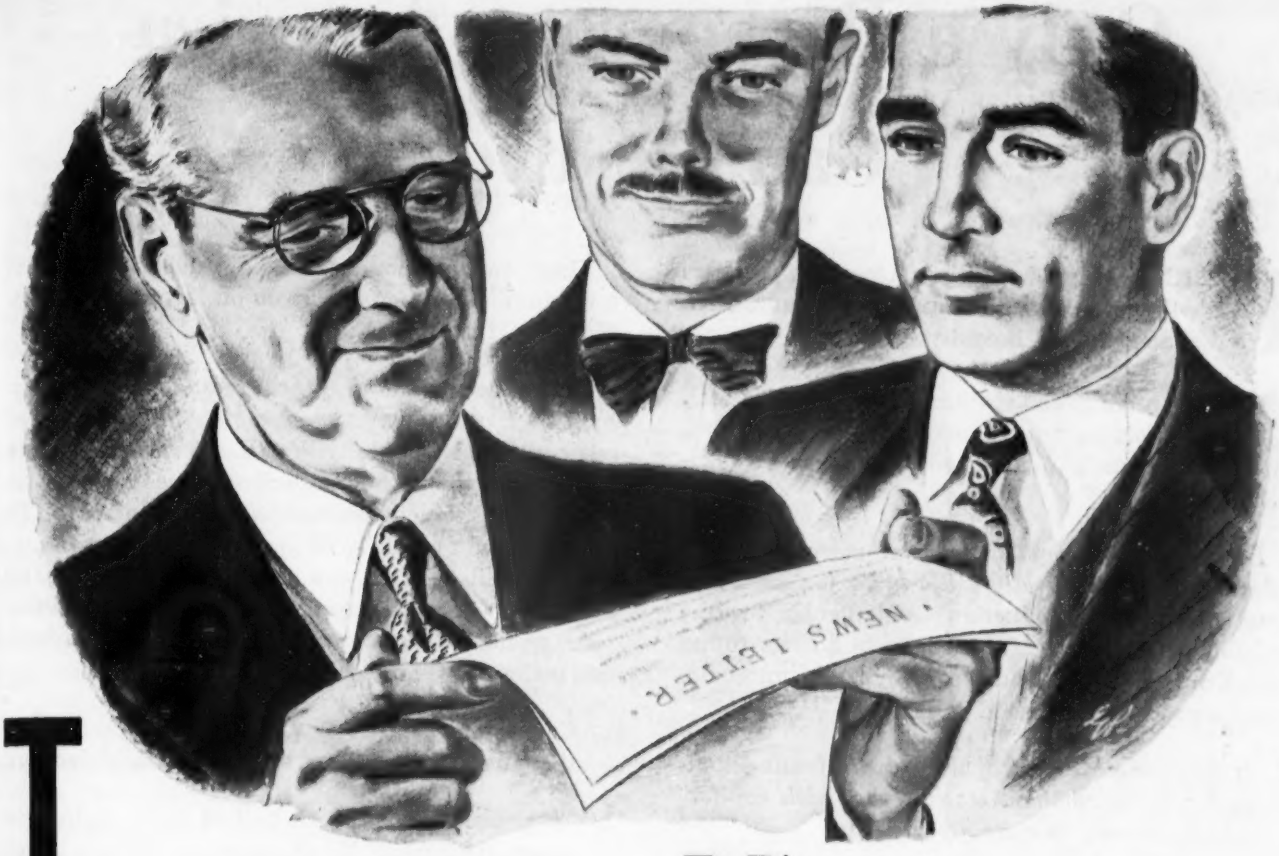
It is reported that in many instances, as a result of mass instrument readings and engineering crew intercommunication, it has been possible to go directly to the point of an internal failure, avoiding a complete engine teardown to locate the damaged component and evaluate the cause of the failure.

Conceivably attributable to the testing technique is the fact that while Turbodynes under test have suffered major failures, none have been explosive, or have damaged the laboratory or injured personnel.

▶ **Setups Improvised**—While the company's test procedure has been responsible directly for a large portion of the overall savings claimed, it must be conceded in all fairness to other engine developers, with comparatively unlimited resources at their command, that much of the Northrop-Hendy economy stemmed from poverty.

For compressor testing, an old 16-cylinder Cadillac engine was used as a power source, and the automobile's rear axle was used to mount a pinion gear which turned compressors at speeds up to 16,000 rpm.

Output of the Turbodyne is tested against a power-absorbing compressor instead of an expensive water brake or dynamometer, which may cost up to $500,000.



The case of airline Y*

Makes Good Reading for Cost-Conscious Executives Concerned With the Problems of Tomorrow

A Day's Earnings of *more than 3 times as much with one Martin 2-0-2* . . . as compared to possible earnings in the same period with a *prewar twin-engine plane!* Yet the much faster 2-0-2's cost of operation per airplane mile is very little, if any, more than the prewar ship while carrying twice the payload!

That's a Typical Example of why Airline Y is enthusiastic about the *new Martin 2-0-2*. And why this modern luxury liner spells profitable operation for airlines everywhere.

Additional Facts . . . Airline Y, a South American line, flew one Martin 2-0-2 *over the Andes 74 times* in less than four months of operation. The present schedule calls for flights of approximately 3150 and 1600 miles on alternate days . . . with a full payload; *36 passengers on the 2-0-2* as compared to *21 passengers on a prewar plane*. Average use on the 2-0-2 has been about eight hours a day . . . a remarkable record since this airline does no night flying and seldom flies on Sunday. The Martin 2-0-2 has been crossing the Andes *when no other airplane could get across* . . . flying at 26,000 feet, over the top of the highest peaks and bad weather in the passes.

For Full Details on the new Martin 2-0-2 . . . and the outstanding performance which has made it *the world's top twin-engine airliner* . . . write today to: The Glenn L. Martin Company, Baltimore 3, Md.

Martin
AIRCRAFT

Builders of Dependable Aircraft Since 1909

* Did you miss "The Case of Airline X"? We'll be happy to send you a copy.

Only a Prosperous America Can Be Free

DURING May 50 million American workers will get from the Congress of the United States a real incentive to work.

This incentive is called a tax cut. Beginning May 1, the withholding tax on incomes will be reduced, giving everyone a much-needed increase in take-home pay.

But the tax cut will have a far more important effect. It may be literally a life-saver for American employment and production — and, hence, for the stability of the world. It will help to do two things which must be done if our economy is to continue to furnish good jobs and good earnings.

1. *It will generate part of the private funds for investment in common stocks — the "risk capital" which we need to sustain prosperity.*
2. *It will provide part of the incentives necessary to make American business management still more effective.*

These two predictions are not advanced as matters of opinion. They are based on facts reported by McGraw-Hill field editors.

These facts show why the reductions in upper bracket income tax rates are most significant for our continued prosperity. For the first time in more than twenty years the tax burden on people who can afford to risk their savings has been lightened. To find out what this will mean to the economy, McGraw-Hill field editors all over the nation asked a group of business executives making $15,000 a year or more how they will use the money which the tax cut gives them. Here is what they said:

1. They plan to save — not spend — three-fourths of the money they keep as a result of tax reduction.
2. They plan to invest one-half of these savings in common stocks. If all persons making over $15,000 follow this pattern, they will make available about a half billion dollars of risk capital for American industry.

WHAT THE TAX CUT WILL DO

What will upper bracket taxpayers do with their tax savings?

What can business expect as a result?

TO ANSWER THESE QUESTIONS, McGraw-Hill field editors interviewed a carefully selected sample of business executives earning $15,000 a year or more. Here, for the first time, are solid facts that show how tax reduction will effect the supply of risk capital and business incentives. These are the results:

1) How much of your tax reduction will you save?	74%
2) How much of your tax savings will you invest in common stocks?	52%
3) Will lower taxes lead you to switch some of your investment in bonds to stocks?	Yes 28%
4) Have you passed up an opportunity to invest in a new business in the last five years because the return after taxes did not justify the risk?	Yes 40%
5) Will lower taxes make you more inclined to take a risk on a new business?	Yes 80%
6) Have you turned down the opportunity to take a bigger job in the last five years because taxes would take too much of the additional income offered?	Yes 13%
7) Do you know of actual cases of executives who have turned down bigger jobs or more work because of taxes?	Yes 38%
8) Will lower taxes make you more inclined to take on a bigger job or more work?	Yes 59%

3. They also will switch some of their present savings from bonds and bank accounts to common stocks. This might easily add a billion dollars or more to the supply of risk capital.

The one-half billion dollars of tax savings and the funds switched from other investments into common stocks is not enough to end the shortage of risk capital. But it is a start.

Before passage of the tax law, risk capital had been growing increasingly scarce.

One measure of the scarcity is that last year only four-tenths of 1% of national income went into new common stocks. In 1925, a year of normal prosperity, almost 3% of national income was invested in new common stocks.

Another measure is that between 1940 and 1947 people actually reduced their holdings of corporate stocks and bonds by nearly a billion dollars. During the same period, people salted away almost $150 billion in such safe havens as cash, bank deposits, and government bonds.

This drought of risk capital hit us just when we need a vastly increased flow of risk capital to finance the expansion and improvement of our American productive machine. We need risk capital to search for new oil fields and to build new pipelines and refineries. We need capital to expand our over-loaded electric and gas utilities. We need it to finish re-equipping our airlines and railroads and bus lines. We need it to modernize our textile production. We need it to keep pace in the magical, booming chemical industries. We need it to launch the new industry of television.

We need capital for all this work and for much more besides. And we must do all this work if we are to keep the United States dynamic and if we are to create new and better jobs.

The tax cut comes just in time. As the last editorial in this series showed, the flow of risk capital must double or triple if we are to avoid a cutback in industrial expansion next year. A major reduction in industrial expansion because of a shortage of risk capital would menace our prosperity. Whenever capital expansion has sagged, the whole economy has sagged. That is the record. That is why every American has a crucial interest in breaking the shortage of risk capital.

The tax reduction now going into effect helps relieve that shortage. In my opinion, we need still other tax changes to assure enough risk capital for healthy industry and healthy employment.

We should encourage the rapid depreciation and replacement of plants and equipment to keep America efficient.

We should eliminate the double taxation of stockholders' incomes.

We should permit full averaging of good years and bad in calculating income tax payments.

We should cut tax rates again as soon as we can.

The tax cut of 1948 will prime the flow of capital. We must keep it flowing.

The tax cut also encourages our successful men and women to work harder and more effectively.

The McGraw-Hill editors collected some solid facts to show how seriously heavy taxes have discouraged business leaders. Here they are:

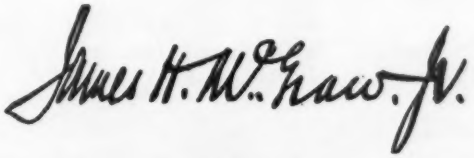
1. One out of seven persons the editors questioned said that they had turned down positions with greater responsibilities because heavy taxes would take most of the greater pay that went with the harder job.

2. Six out of ten executives would be more inclined to accept a more responsible job now that taxes will let them keep more of the added pay such a job would bring.

We all have a stake in incentives which make men work harder, especially talented men. The more we each work, the more we all have.

The tax reductions so far made will leave the government more than enough revenue to meet all its expenses, including the proposed defense expenses, and still reduce the national debt. If more defense money becomes necessary, vigorous economy on less essential government expenses will make possible both stronger military defenses and a better tax system. We need both.

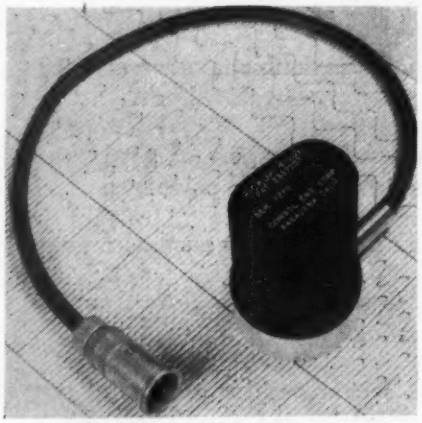
Only a prosperous America can be strong enough to remain free – and to help keep the rest of the world free.



President, McGraw-Hill Publishing Company, Inc.

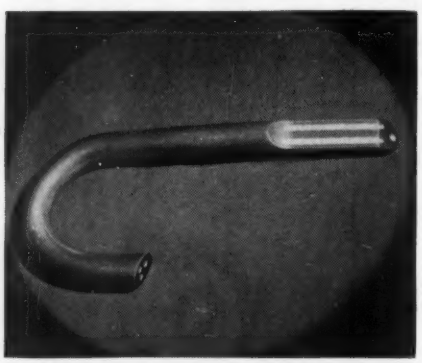
THIS IS THE 67TH OF THE SERIES

NEW AVIATION PRODUCTS



Velocity Pickup

Self-generating velocity pickup, Type 4-102, adaptable for study of vibratory characteristics in structures whose orientation changes during measuring cycle, is made by **Consolidated Engineering Corp.**, 620 N. Lake Ave., Pasadena, Calif. Ten-ounce instrument is 2¾ in. high, 1-15/16 in. in dia., and has seismic element supported on double flat helical springs to eliminate bearing surfaces and preclude sticking of moving mass. Claimed is that minimum amplitude which may be recorded is limited only by amplifier gain, and indicator or recorder sensitivity. Company's Type 1-110 vibration meter is compact, portable, visual-indicating instrument to measure displacement (peak to peak) and velocity (average) in conjunction with self-generating velocity type pickups.

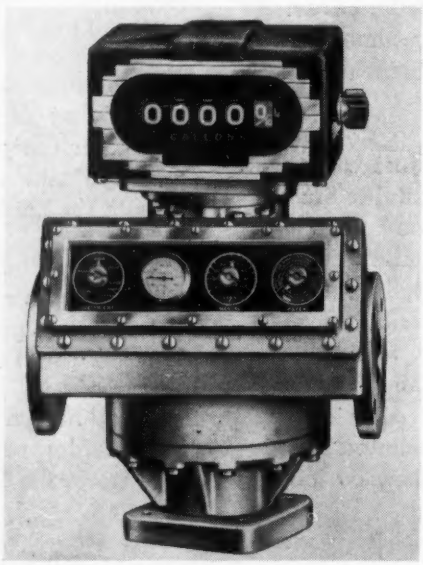


Soldering Material

"Tri-core Leakpruf" acid-core solder developed by **Alpha Metals, Inc.**, 363 Hudson Ave., Brooklyn 1, N. Y. is offered for use with stainless steel, Monel, nickel, and other metals. Solder has three-core construction and uses synthetic acid stated to be more active as flux than zinc chloride, yet only half as corrosive.

Refrigerant Insulation

Plastic foam insulating material, applicable to air transport refrigeration, is announced by **United States Rubber Co.**, 1230–6th Ave., N. Y. C. Combining low thermal conductivity with light weight, material is non-corrosive, non-toxic, and self-extinguishing. Claimed as not supporting mold or bacteria growth, and holding insulating value over wide range of mean temperatures, material is available in shredded form weighing .8 to 1 lb./cu. in., or block form .8 to 1.5 lb./cu. in. Blocks and slabs can be produced in variety of sizes and shapes to fill cavities and surfaced with paper, cloth or resin coatings.

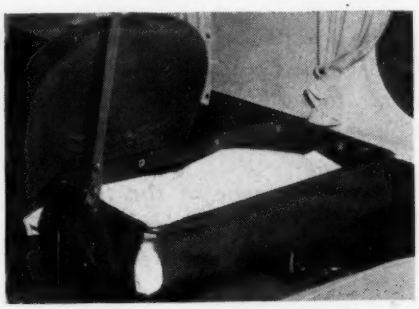


For Fuel Metering

Automatic fuel temperature compensating meter for maintaining correct limits of weight and balance in aircraft is offered by **Granberg Corp.**, 1308-67th St., Oakland, Calif. Adaptable to liquids within range of .003–.009 expansion coefficient, unit will compensate for temperature fluctuations from 0-220 deg. F. Where 110 octane fuel is specified, device is adjusted at factory. Changeovers to different products are made by dial movements to liquid's coefficient of expansion.

Aircraft Fabric

Koroseal coated glass fabric covering for airplane insulation use is announced by **B. F. Goodrich Co.**, Akron, Ohio. Advantages claimed include flameproof and flame-resistant qualities, resistance to abrasion, and impermeability to hydraulic fluids, oil, gasoline, or water. Fabric is offered in black, white, and nine pastel colors.



For Flying Babies

Providing added comfort and ease when air-traveling with infants is bassinette built by **Pacific Overseas Airlines**, International Airport, Ontario, Calif. Small mattress is fitted in unit and serving tray snaps on frame. Child can sleep, eat, and be dressed in bassinette. Unit can be removed quickly or stowed at side of plane.

Information Tips

For Metal-Forming

Applicable for production of metal articles where quantity required is too small to justify expensive tooling changes is "Mecatorn," mechanical process for precision forming described in booklet issued by **C. W. Torngren Co.**, 82 Skilton Ave., Somerville, Mass. Accommodating pieces of light gage metals up to 12 ft. dia., and heavier gages to 3 ft. dia., new process is stated to be specially adaptable to industrial research and development projects.

Production Control Procedures

Of interest to superintendents and works and production managers is brochure titled "Controlling, Handling, and Housing Shop Orders," offered by **Diebold, Inc.**, Canton 2, Ohio. Booklet presents streamlined methods for control of manufacturing operations with story-telling illustrations spotted throughout printed matter.

Flexible Tubing

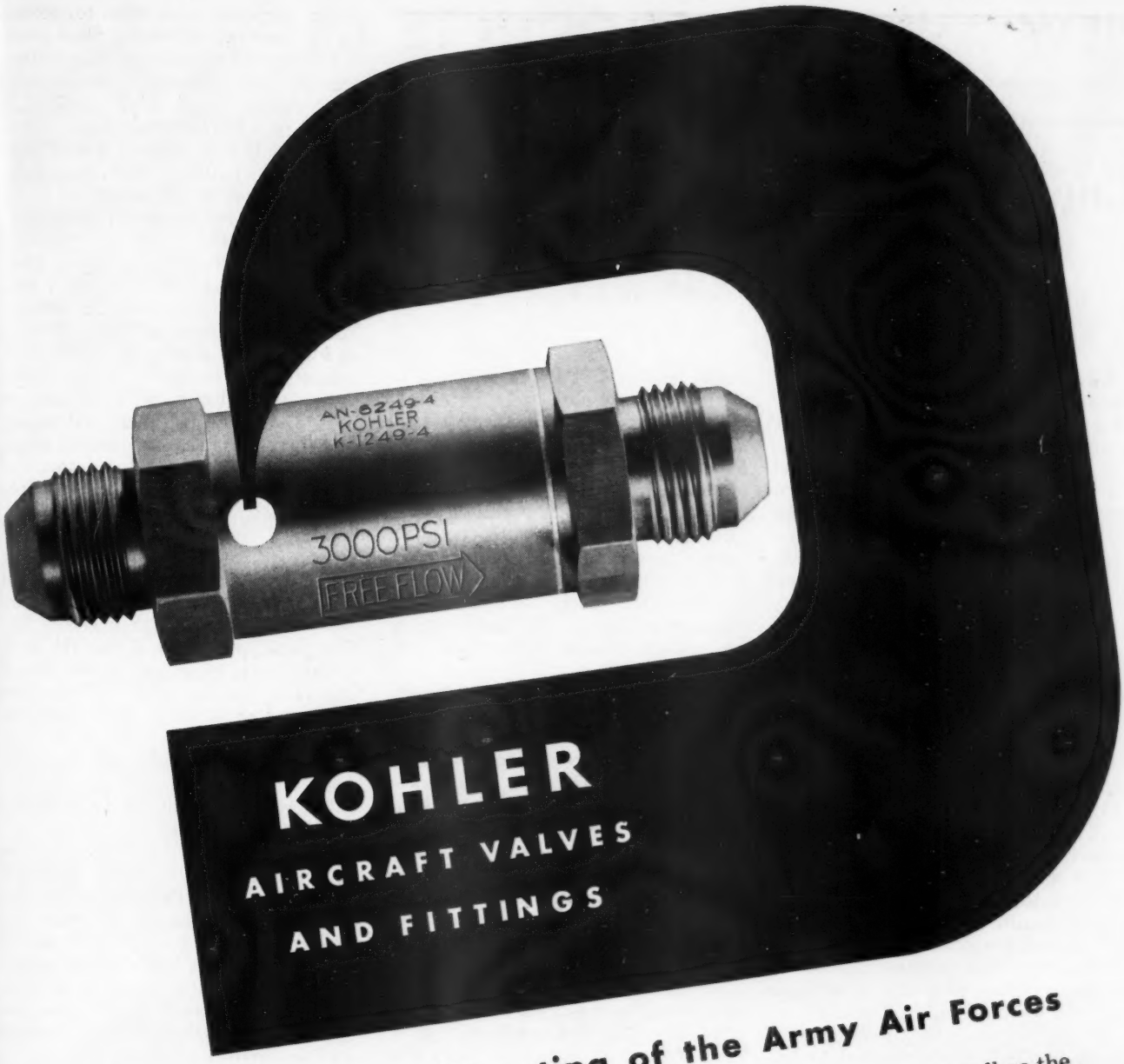
New folder "Titeflex Monel Flexible Tubing," published by **Titeflex, Inc.**, 510 Frelinghuysen Ave., Newark, N. J., is offered as aid to production engineers. Included are descriptions of physical properties and corrosion-resisting characteristics of material, together with various applications of tubing.

Conduit Fittings

Cannon Electric Development Co., 3209 Humboldt St., Los Angeles, Calif., announces production of AN3060, 45-deg. conduit coupling; AN3064 box connector, and AN3068 conduit coupling adapter. AN3060 is used for connecting either flexible or rigid aluminum brass or other conduit; AN3064, with AN3066 locknut, forms termination inside conduit boxes or panel; and AN3068 makes coupling between male threaded conduit fittings.

About Locknuts

Booklet titled "Engineering Data" offered by **Nylok Corp.**, 475 Fifth Ave., N. Y. C., contains detailed information on company's locknut and use of Nylon as a locking feature. Announcement is also made that AN approval has been issued on all sizes of Nylok machine screws as well as larger locknuts of AN365 type.



Made under "approved" rating of the Army Air Forces

THROUGHOUT the war Kohler aircraft valves and fittings sustained a high reputation for quality control. The stainless steel Hydraulic Cone Check Valve shown above bears the Army-Navy "yellow dot"— indicating that it passed the exacting qualification test for stress of combat conditions. All Kohler valves and fittings were made under the "approved" rating of the Army Air Forces. Their excellence demonstrates the skill and precision of Kohler workmanship—a 75-year-old tradition.

Leading aircraft manufacturers, as well as the Armed Services, have used Kohler valves and fittings in great quantities. Kohler Co. has won increasing acceptance as a source of prompt, reliable service made possible by the fact that complete facilities for forging, machining and anodyzing are maintained at the Kohler plant.

These facilities are ready to serve your present needs accurately and without delay. Write for a copy of our illustrated Catalog J.

Kohler Co., Kohler, Wisconsin, Established 1873.

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS

FINANCIAL

Convair's Prize Deficit for 1947

Loss of more than $42 million before tax credits is industry's highest and due chiefly to transport project.

The high point in 1947 deficits in the aircraft industry was reached by Consolidated Vultee Aircraft Corp. with a total loss of "approximately" $42,976,341 for the fiscal year ended Nov. 30, 1947. Carry-back tax credits are computed to leave a net operating loss of $16,721,393.

Despite the careful additions and subtractions, there is a tenuous note in the reported losses and offsetting tax credits. A careful reading of the financial statement discloses the many qualifications which presumably led the management to insert the word "approximately" before the spelled-out total loss.

▶ **Liner Loss**—The net operating loss, before any tax recovery, reached $36,021,393. Of this amount, $32,389,703 was attributed to the Convair-Liner project.

The management, on the advice of its accountants and its tax counsel, expects eventually to recover $19,300,000 through the carry-back provisions of the tax law. This adjustment is shown in the company accounts as resulting in a net loss of $16,721,393.

In the over-all calculation of total losses, $6,954,948 was assigned to the sale of non-aviation assets. This item appears "below-the-line" in the surplus adjustment accounts.

In the same category, but not included in the over-all loss computation for the year, is an item of $11 million as an estimated additional loss on the Convair-Liner if no more than 178 planes are sold. However, this is nothing more than the segregation of surplus and the creation of a special reserve. This transfer can easily be reversed if it should happen that the potential anticipated loss on this project does not materialize.

▶ **Costs Assigned**—The recorded loss on the Convair-Liner reflects the drastic write-down of inventory accounts, development and experimental expenses and other charges associated with this project. Further, at the outset of the 1947 fiscal year, the company changed its accounting policy. It now assigns actual costs to each specific plane instead of using an estimated predetermined average cost for each model, as was done in the past.

Earnings for the current year will be influenced to an important degree by the company's success in selling more Convair-Liners. A total production of 178 planes has been scheduled. Of this group, 158 are on customer orders; the remaining 20 are being built in anticipation of ultimate sale. Should no additional orders be received, the company anticipates the indicated additional loss of about $11 million from this project.

There is little doubt that a major reason for these huge losses on the Convair-Liner was an underestimation of the costs of production upon which the initial sales prices were based. The company withdrew its quotations for this plane a few months ago, presumably to obtain a better concept of its costs.

▶ **New Price**—Evidently, the company has now made this cost determination. It is reliably reported that the Convair-Liner is again being aggressively sold. This time the price of the transport is expected to range from $450,000 to $500,000. This represents a 20 to 30 percent jump in price since sales were halted and the domestic price of around $380,000 withdrawn. The price of the plane when first offered reputedly was around $275,000.

There is also reason to believe that Convair will not return to a fixed pricing of the plane. Instead, negotiated contracts incorporating the individual requirements of the airlines, will contain escalator provisions.

Of the estimated tax refund anticipated by the management, $11,915,840 was received in January, 1948. The balance of about $7,400,000 is subject to further determination by the Bureau of Internal Revenue after final audit of tax returns for the past four years. This may represent a time-consuming process.

▶ **Carry-Forward Hope**—While Convair has exhausted all of its tax carry-back credits, it may benefit through the carry-forward provisions of the tax laws. Operating losses for 1947 and deficits incurred during 1948 can be applied, for tax purposes, as an offset to income for the next two succeeding fiscal years.

Due to the write-down of inventory accounts, the company incurred a technical default in its bank loans. On Nov. 30, 1947, total bank loans amounted to $15 million. Tax refunds received in January, 1948, permitted the retirement of $4 million of these to be figured for the next two succeeding fiscal years.

To correct its working capital position, Convair has entered into a new agreement extending to Apr. 1, 1950, a loan for a maximum of $20 million at an interest rate slightly in excess of 3½ percent. As a condition to this credit, the company has agreed to supply at least $7 million in additional equity capital. The Atlas Corp., largest single stockholder, has agreed to advance the indicated minimum funds prior to any public offering.

▶ **Atlas Commitment**—This commitment by the Atlas Corp. is interesting in view of its present ownership of 131,900 shares of Convair stock at an estimated cost of more than $1,800,000. The presumption is clear that the Atlas Corp. expects to recover its investment and more besides when it completes the round of its cycle of ownership in Convair.

There is little doubt that the prospect of increased aircraft procurement enhances the likelihood of improved conditions at Convair.

The existing backlog of the company is not conducive to direct profitable operations. As of the close of the last fiscal year, the company reported total unfilled orders of around $207 million. These consisted of $138 million in military orders, about $36 million in commercial and personal plane orders and approximately $33 million in research and development contracts.

Most of the military work, however, is on a cost-plus-fixed-fee basis which, ordinarily, is not susceptible to a high profit rate. Further, such production may take a few years to complete. The commercial business, as has been shown, has been accepted at a loss. Research contracts have rarely been profitable but are desirable for the promise they may afford in obtaining production contracts.

After the various adjustments of last year, net working capital per outstanding share amounts to about $12.40. The bulk of this, however, is represented in inventory accounts and is subject to ultimate liquidation through completion of contracts.

The traditional pattern ascribed to Atlas Corp. in investing in and managing special situations and subsequently liquidating them at a profit gives promise of being a long time in fulfillment at Convair.

—Selig Altschul

Dependable

CHAMPION

America's Favorite Spark Plug

C26—
Unshielded
Actual Size 2⅛"

R 37 S
Actual Size
Shielded Type

CERAMIC
Aircraft Spark Plugs

products
of specialization

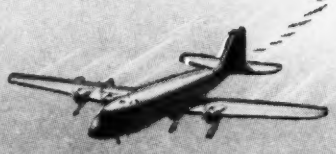
Because Champion produces spark plugs *exclusively*, it backs its products with research, engineering and manufacturing facilities unequalled in the field. These facilities are well known to aircraft engine manufacturers and air transport operators because of the ignition clinics held periodically in our Detroit Ceramic division and in the Toledo plant. Today we feel sure that through this specialization, Champion *Ceramic* Aircraft Spark Plugs provide structural and operative superiorities not found in any other aircraft spark plug. Champion Spark Plug Company, Toledo 1, Ohio.

Listen to the CHAMPION ROLL CALL, Harry Wismer's fast sportscast every Friday night, over the ABC network

USE
CHAMPIONS
AND FLY WITH CONFIDENCE

ECLIPSE-PIONEER

Enhances its fine name and quality of product with a nation-wide, factory-supervised, distributor organization for complete service and maintenance of your Eclipse-Pioneer aircraft products!



For assistance with your service problems—to expedite your maintenance work—we present—"Your Local Distributor."

ALASKA
Anchorage, Pacific Airmotive Corp., Merrill Field

CALIFORNIA
Burbank, Pacific Airmotive Corp., 2940 North Hollywood Way

FLORIDA
Miami, Barfield Instrument Corp., Hangar #1, International Airport

GEORGIA
Hapeville, Aviation Supply Corp., Atlanta Municipal Airport

ILLINOIS
Chicago, Snyder Aircraft Corp., 5315 W. 63rd St.

KANSAS
Kansas City, Pacific Airmotive Corp., Hangar #5, Fairfax Airport
Wichita, The S. A. Long Co., Inc., 650 E. Gilbert

KENTUCKY
Louisville 4, Ellingsworth Auto Electric Co., 1003-05 E. Broadway

MASSACHUSETTS
East Boston, Inter-City Aviation, Inc., Boston Municipal Airport

MICHIGAN
Detroit 5, Servair, Inc., Detroit City Airport

MINNESOTA
Minneapolis 6, Airwings, Inc., Wold-Chamberlain Field

NEW YORK
Buffalo, Buffalo Aeronautical Corp., Buffalo Airport
Mineola, L. I., Standard Aircraft Equipment Co., Roosevelt Field

OHIO
Cleveland, General Airmotive Corp., Municipal Airport

TEXAS
Dallas, Southwest Airmotive Co., 3416 Love Field Drive

WASHINGTON
Seattle, Pacific Airmotive Corp., Boeing Field

CANADA
Montreal 18, P.Q., Aviation Electric Limited, 3483-5 Park Ave.

Eclipse-Pioneer DIVISION OF Bendix AVIATION CORPORATION
TETERBORO, NEW JERSEY

Market Hope: Slow-Speed Landings

Bollinger-Tully survey of fixed-base operators points to need of new plane designs and close-in airports.

By ALEXANDER McSURELY

If personal aircraft manufacturers build a plane which will make short, quiet, easy, slow-speed landings and takeoffs, in convenient small close-in landing areas, the personal aircraft mass market potential will have a much better chance of realization.

Such a plane would be much more useful than any now on the market and until it comes along, there is little hope for the personal plane business to expand materially in the near future.

These are the primary conclusions of the well-documented survey report, "Personal Aircraft Business at Airports," by Prof. Lynn Bollinger and Arthur H. Tully, jr., released by Harvard University Business School research division.

▶ **Expert Appraisal**—Easily the most comprehensive study ever produced of the fixed-base operation and the personal plane, the Bollinger-Tully report is a result of a 1946-1947 field investigation of 180 fixed-base operators at airports in 40 states. The survey was made by the authors and two research assistants, all with aviation background. Bollinger, a one-time southern Ohio fixed-base operator, is recognized as an outstanding aviation research analyst; Tully formerly was Massachusetts Aeronautics Director. Both men are private flyers.

While more than a year has elapsed since most of the field investigations were made, there has been little change. The industry is seen as suffering from restrictions which grew up around planes like the post-World War I Curtiss JN-4 Jenny, and its immediate successors, all with similar flying characteristics. Airports required by these planes are still in many respects the basic airports in use today. And today's airplanes still are being designed to fit those airports.

▶ **8000 Operators**—Rapidly changing number of fixed-base operators in the country is placed at around 8000, but the survey finds that approximately 10 times that number of persons are interested in getting into that field. This figure probably would be altered downward somewhat on basis of present day conditions.

Probably the most significant single part of the report is a table on "selected factors affecting use of personal aircraft." This table shows, by states, the number of planes per 100,000 population, airports per 100,000 population, square miles per 100,000 population, miles of surfaced rural highway per 100 square miles of land, percent of days flyable in the year and the estimated effective buying income per family (1946).

It is the trends indicated by this table which lead the report's authors to their primary conclusions: a revision is needed in personal plane design, and there should be a new pattern of small, close-in airports which the revised designs would make possible.

▶ **Population and Use**—The analysts point out the direct connection between the number and convenience of landing areas in each state and the per capita ownership of aircraft in the same state. Generally there is indicated a greater success of personal aircraft in the sparsely populated areas where land values are low. It is concluded that the airplane is more acceptable because of greater convenience and utility when "low-priced land for airports close to population centers gives large portions of the population ready access to the air and to one another by air."

Another inference from this fact is that the usefulness of conventional aircraft in more populous sections of the country—and thus the future of personal aircraft—is dependent upon establishment of a larger number of conveniently-located landing areas which similarly would provide convenience and utility to the persons within these areas.

▶ **Safety and Use**—A direct relationship between the safety of the vehicle and the increasing number of landing places is pointed out, and the combination of safety, and greater utility eventually would bring about increased usage to a point where cost could be reduced.

However, the only means of providing the conveniently-placed landing areas required for the success of such a program is by using small close-in fields of limited area, which would not be practicable or safe for use with the conventionally-designed personal planes. And that is where the prerequisite of the airplane capable of slow-speed landings and takeoffs is important.

Bollinger and Tully have not overlooked the possibility of the helicopter, but point out it is not expected to be ready for use as a personal aircraft for sometime yet. Meanwhile, they point out, designs capable of landing at speeds around 25 to 30 mph. have been available for years.

▶ **Foreign Designs**—Reference is made to a Polish four-placer with a 260 hp. engine which won the European international touring contest in 1934 and which was capable of landing or taking off in 250 ft. over a 26-ft. obstacle, although its cruising speed was in line with other planes of its day. (British aeronautical scientists have been testing a captured experimental German Zaunkoenig single-placer with full span slots and flaps, which takes off at 31 mph. in 55 yd. with a 4-mph. wind. German reports indicated the plane could be used safely with a landing area of 20 meters by 100 meters.)

Emphasis on aircraft noise reduction as another factor in making the close-in small field acceptable to neighbors was pointed out.

The report sees scant prospect for profits for the average fixed-base operator as long as conventional personal planes are marketed, and urges tight, economical, careful business operation as a necessity for survival.

Operators Fight Field Restrictions

Flight school operators opposing the expansion planned for Wold-Chamberlain Field, Minneapolis and St. Paul, have obtained a court order stopping work on the field. Metropolitan Airports commission has been preparing to lengthen two runways and build a new runway, and has ordered restriction of flight instruction at the field.

The writ was obtained by Depponti Aviation Co. for district 3 of the Minnesota Aviation Trades Association, which in addition to Depponti includes Hinck Flying Service, Inc., Lakeland Skyways, Parker Aviation Co., and Twin City Fliers, all at Wold-Chamberlain Field.

In asking for review, the writ argues that the commission in deciding to expand Wold-Chamberlain field, showed "partiality, bias and prejudice," and that the order was arbitrary and unreasonable, contrary to the law, the evidence and the facts.

In announcing, after three public hearings, its program to expand Wold-Chamberlain Field, the airports commission said in a policy statement that restriction of flight instruction at the field would be necessary.

Sinclair Research

...HELPS INCREASE ENGIN

Of all contributions to aviation since the war, none has had greater effect on safety, speed, and general operating efficiency than improved engine maintenance, and — according to leading airlines — one of the most notable factors in this general improvement has been increasingly greater lubrication efficiency.

For many years, Sinclair has been a leader in research and development on aircraft engine oil . . . *with outstanding results.* And so, American Airlines great fleet of transports — *using Sinclair AIRCRAFT OIL exclusively* — has been able to increase the time between overhaul periods by 150%! Where the C.A.A. once approved only 400 hours, it now authorizes over 1000 hours.

Sinclair AIRCRAFT OIL is carefully made from finest crudes to give outstanding lubrication performance in all types of airplane engines. It is a proven factor in greater flying efficiency.

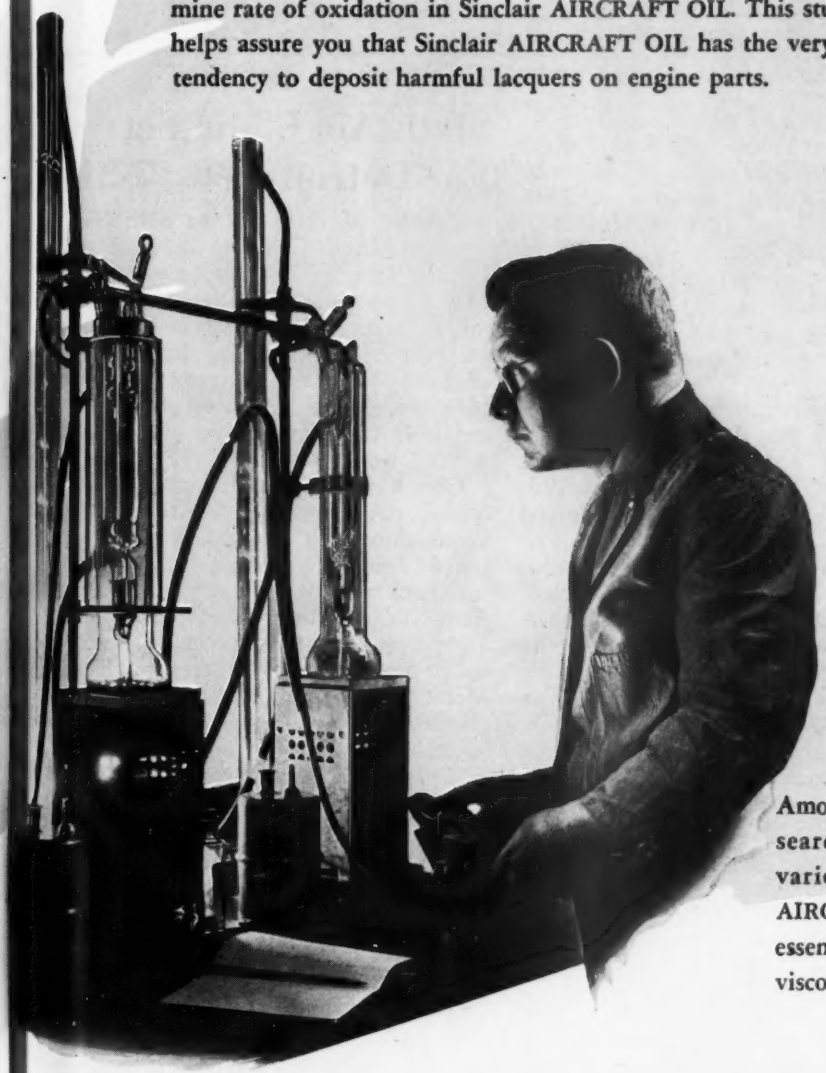
UNFAILING MEASURE OF DEGREE OF REFINEMENT

Type and degree of refinement constitute the major source of improvement over the years in Sinclair AIRCRAFT OIL. By means of the Refractometer, Sinclair Research experts determine — by specific dispersion — when the oil contains the best ratio of naphthene and desirable aromatic hydrocarbons . . . *for highest engine protection.*

FLYING HOURS 150% BETWEEN OVERHAULS

ASSURANCE OF HIGH RESISTANCE TO OXIDATION

Harmful deposits, other than lead, form in aircraft engines, because of oil oxidation and incomplete combustion of gasoline. Sinclair's "Young Man With a Horn" and others like him at Sinclair Research Laboratories, use the oxygen absorption test shown at right to determine rate of oxidation in Sinclair AIRCRAFT OIL. This study also helps assure you that Sinclair AIRCRAFT OIL has the very lowest tendency to deposit harmful lacquers on engine parts.



PROPER VISCOSITY IS ASSURED

Among important instruments for control and research work on all types of lubricating oils are various viscosimeters. To make sure that Sinclair AIRCRAFT OIL is of the proper viscosity to provide essential engine protection, Sinclair Research uses many viscosimeters, including the Fitzsimons, shown at left.

SINCLAIR

SINCLAIR REFINING COMPANY • AVIATION SALES • 630 FIFTH AVENUE, NEW YORK

AVIATION MERCHANDISING

Two views of the new Air Associates, Inc., aviation products store at Dallas show the careful planning for maximum display of merchandise. Store was planned by Goodyear Tire & Rubber Co.'s merchandising laboratory, which also installed fixtures and store equipment as a part of the service that the company renders to its dealers and distributors.

Operators Told To Guard Safety

Responsibility for greater safety in personal flying has been dropped on the fixed-base operator's hangar floor.

Poor maintenance and lackadaisical enforcement of flight rules were the prime contributors to non-air carrier accidents which Joseph M. Chase, Aero Insurance Underwriters' engineering superintendent, cited at New York's 18th Annual Safety Convention and Exposition.

▶ **Management's Job**—And its management's job to get down to the serious business of eliminating them, Chase said.

Just a few of the taboo items are leaking gas pumps, dope-spraying near an open flame, allowing flammable trash to accumulate.

▶ **Costly Negligence**—According to the National Fire Protection Association, the cost of 187 hangar fires was estimated at $53,229,000. Of these, 19 percent were due to defective hangar heating and wiring; 26 percent to smoking and general carelessness; 13 percent to "outside factors"; and 42 percent to bad maintenance and storage practices.

Lack of good tie-downs during windstorms, collisions and nose-ups because of too-fast or too-slow taxiing or taxiing without a guide are further instances which Chase noted. In addition to providing safer flight conditions, the fixed base operator will have to clamp down on the "renter pilot who will pull a buzz job, or the beginner who insists on venturing cross country in spite of weather, instructions and not being able to navigate."

Of the non-air carrier accidents reported for 1946 (AVIATION WEEK, Apr. 5), pilot error was considered to be the cause in 1622 instances of 2592 landing accidents; 1090 of 1261 collisions; 728 of 760 spin stalls; 534 of 1372 forced landings; and 361 out of 567 takeoffs.

Wayne Airport Expands

A $3,500,000 improvement program at Detroit's Wayne County Airport is underway and when completed will make the field a serious rival of Willow Run Field as major air terminal for Detroit.

Contracts for $1,100,000 of construction have already been let including relocation of drains, sewers, excavation, grading storm and water pumping station, electrical contracts. Remainder of work to start in July will include grading and paving three runways, and a central concrete apron for terminal administration building and airline stations. An additional program to start in July, 1949 calls for construction of the terminal and paving of additional terminal apron.

Completed airport will occupy four square miles, and will be served by the John C. Lodge and Edsel Ford express highways, placing the field within 25 minutes of downtown Detroit by auto, or 11 minutes closer than Willow Run.

Airport manager Leroy C. Smith reported present facilities at the field are overtaxed and that 17 applications for hangar storage have been turned down recently because of overcrowding.

Funds for the improvement program are being supplied half by the county and half by the Federal government.

Sixth Air Clinic Set For Detroit Oct. 17-21

Detailed planning for the sixth National Aviation Clinic to be held at Detroit, Oct. 17-21, will be arranged May 11, at a session of the rules committee meeting with Detroit and Michigan aviation leaders at the Book-Cadillac Hotel, Detroit. Ray Nyemaster, Des Moines attorney, and chairman of both the 1947 and 1948 Clinic rules committees, will preside.

Gov. Kim Sigler of Michigan has accepted co-chairmanship of the 1948 Clinic along with the president of National Aeronautic Association which continues as co-sponsor of the Clinic. Aero Club of Michigan and Michigan State Department of Aeronautics will be co-hosts. Arthur I. Boreman, Des Moines, current president of NAA, has announced he will not be available for re-election at the NAA annual convention, June 27 at Minneapolis. Therefore the name of the Clinic co-chairman who will serve with Gov. Sigler will not be known until after the Minneapolis convention.

Headquarters for the 1948 Clinic will be in the Book-Cadillac Hotel with business sessions in the Detroit Masonic Temple a few blocks away. Registration begins Sunday night, Oct. 17, with preliminary meetings Sunday and Monday, and actual Clinic sessions on Oct. 19, 20 and 21.

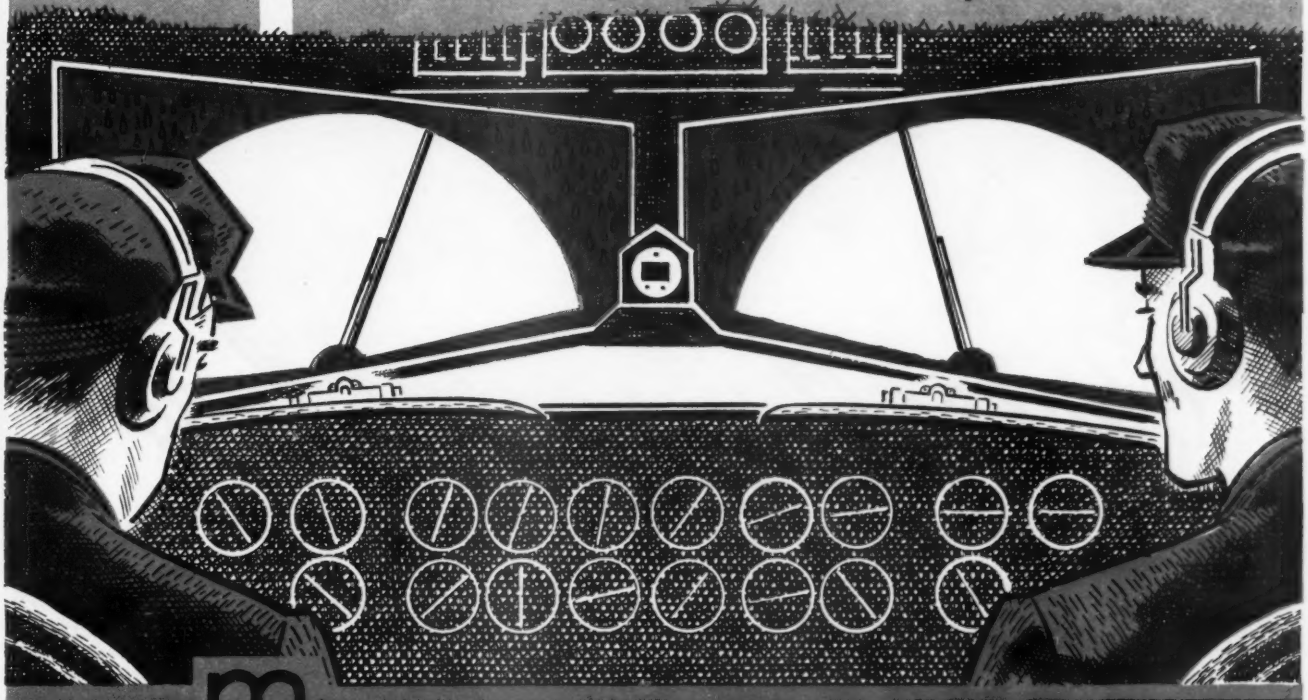
Pattern of the fifth annual Clinic, held at Springfield, Ill., last November, as a unicameral legislative forum with bills of action presented by various aviation interests for discussion and action, will be followed at the Detroit meeting.

The NEW Marquette model 3V hydraulic wiper

. . . is the result of 10 years of experience in this highly specialized field. It incorporates every feature that is desirable and practical, based on thousands of installations on military, naval and commercial aircraft.

gives you *all* these advantages

- Blades are synchronized at all times.
- Obstruction in path of blade will not stall it.
- Blades may wipe in same or opposed direction.
- Blades are parked and locked when wiper is not in use.
- Universal drive arm and tie rod require minimum stock of parts.
- Wiper blades are easily replaced.
- Pressure is removed from system when not in operation.
- Motor unit may be located at any position in the airplane.
- Stroke on each window can be varied.
- Hydraulic tubing eliminates linkage control and provides additional space for mounting other instruments.
- Motor unit and window units are universal, providing maximum interchangeability of parts.
- Constant torque values through entire stroke.
- Uniform stroke at all speeds.
- Simplicity of design, resulting in lower first cost and reduced maintenance expense.



The Marquette METAL PRODUCTS CO.
CLEVELAND 10, OHIO

SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Manufacturers of: HYDRAULIC AND ELECTRIC WINDSHIELD WIPERS · FUEL OIL PUMPS
HYDRAULIC GOVERNORS FOR DIESEL ENGINES · ROLLER BEARING TEXTILE SPINDLES
AIR COMPRESSORS · PRECISION PARTS AND ASSEMBLIES

Tune in the Dick Haymes Show for Auto-Lite—Thursdays, 9:00 P.M., E. T. on CBS.

Aircraft Spark Plugs

by...

AUTO-LITE

• **Years of experience have provided Auto-Lite with proved engineering skills for the designing and building of spark plugs for America's private and transport planes. All Auto-Lite Aircraft Spark Plugs have C.A.A. approval for use on engines as specified.**

The reception of the Auto-Lite line on the part of engine manufacturers has been most gratifying. They have recognized the advantages of the special features found in Auto-Lite patented plugs as well as the well-known ability of Auto-Lite to produce quality products at low cost. Write for catalog.

THE ELECTRIC AUTO-LITE COMPANY

Sarnia, Ontario **Toledo 1, Ohio**

MONEY CANNOT BUY A BETTER SPARK PLUG

Community Project

Darrington, a logging town with 500 population on the western slope of the Cascade Mountains in Washington state, has made the construction of an airport a real community project, working under obstacles that would stop much larger cities.

The only site available was a solid stand of timber. But loggers are numerous at Darrington and many of them volunteered their services. In addition, all the Darrington civic clubs, like the Lions and Chamber of Commerce, furnished their quota of workers. The women furnished the lunches. When the trees were felled, the logging companies in the area offered bulldozers and small crews of men to help.

As a result, the 30-acre site was cleared in little more than a month. Much work remains to complete a half-mile landing strip 200 ft. wide, but Joe Kelley, airport manager, expects to be ready to receive the first plane by June 25.

New Airports Planned

The Washington State Aeronautics Commission has outlined an emergency airport construction program for 1948 which calls for the consideration of five new sites.

The new sites, in order of priority, are: (1) Randle or Packwood, on the west side of White Pass on the slopes of Mt. Rainier; (2) Beverly, on the Columbia River east of Ellensburg; (3) vicinity of Steptoe Butte, in Whitman County; (4) Stevenson, in the lower Columbia River Gorge; and (5) Queets, on the ocean side of the Olympic Peninsula.

Number of airports actually constructed will depend largely upon how far the original $200,000 appropriation can be stretched, and how quickly property can be acquired.

Standard Service Charges

Managers of the major airports in western Washington state have agreed on standardized service charges which they hope all the larger airports in the state will accept.

The suggested rate schedule includes tie down fees, hangar rent, fees for commercial operation, transient plane fees, ground rental, gasoline charges, non-aviation concessions, barnstorming, scheduled and non-scheduled airline charges.

The suggested schedule was formulated by George A. Forbes, manager of Snohomish County's Paine Field, Everett; Ned Stokes, Renton Airport; Earle Bigler, Seattle-Tacoma Airport; Donald A. Bell, Bellingham Airport, and Dayton Witten, Boeing Field, Seattle.

BRIEFING FOR DEALERS & DISTRIBUTORS

MANUFACTURERS' CERTIFICATION–First tangible step toward eventual certification by personal plane manufacturers of their own planes (subject to a CAA approved general standard) has been taken by F. B. Lee, acting administrator. Proposal asking for suggestions on standards from Personal Aircraft Council of Aircraft Industries Association, Aircraft Owners and Pilots Association, Aviation Underwriters, and 500 personal plane owners selected at random, have been sent out by CAA. On basis of industry, and consumer comment, CAA will draft a proposed amendment to existing Civil Air Regulations which would make the "self-certification" possible by manufacturers who maintain adequate production standards. If the regulations are simplified enough to really give the manufacturers some freedom and responsibility, it may be one of the best things that ever happened for the lightplane business. A large part of the cost of developing a new airplane is the terrific amount of paper work, and engineering manhours consumed in meeting CAA requirements. If a system is worked out where the responsible manufacturer will have reasonably free rein except for his desire to stay in business by making safe airplanes which people will buy, a fair-sized chunk of unnecessary manufacturing cost will be eliminated from the list price of each airplane. Probably it will be several months before manufacturers and consumers develop their recommendations but the matter is under discussion by both groups.

187 PIPERS–Early unofficial reports on April shipments by personal plane manufacturers established the month as the largest of the year thus far, and showed a healthy seasonal upturn. Piper Aircraft led companies reporting with 187 planes of which 137 were the new PA 15 Vagabonds, 44 PA 11 trainers, one PA 14 four-place Family Cruiser, and 5 PA12 three place Super Cruisers. Cessna was second with 150 planes including 98 of the two-place 90 hp. 140s; 16 of the two-place 85 hp. 120s; 14 of the big 220 hp. five-place 190s and 22 of the new 145 hp. four-place 170s. Other reports included: Stinson, 82 Voyagers; Beech, 69 Bonanzas; Luscombe, 63, Aeronca, 79 (plus 6 military liaison two-placers) Aeronca total included 30 four-place 145 hp. Sedans, 41 Champion tandem trainers, and 8 side-by-side Chiefs; Beech 69 Bonanzas; Luscombe, 63 two-placers including 7 of 65 hp.; 35 of 85 hp. and 21 of 90 hp.; Ryan, 53 Navions, and Fairchild, 6 F-24s. Significant in the totals reported is the fact that 346 of the planes shipped were four-placers, which means that dollar volume per plane will be up.

JOHNSON GETS HELICOPTERS–Johnson Flying Service, Missoula, Mont. has taken delivery on two Bell Model 47D helicopters, which were shipped on a DC-3 from the plant to Missoula. Company has been a contract flyer for the U. S. Forest Service since 1931, and will use the Bells to shuttle smoke jumpers, from forest clearings to air strips, as well as for crop dusting, patrols, snow surveys, game counts, etc.

CAA PILOT TEST KIT–CAA has prepared a commercial pilot examination kit, available for 30 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, 25. Kit includes a guide showing what material should be studied in preparation for commercial pilot test, how the examination is given and mechanically graded, sample test questions for student practice, a world aeronautical chart and a daily weather map.

STINSON PROMOTION–Stinson division, Consolidated Vultee, announced plans for a $250,000 advertising and promotion campaign beginning in May to stimulate Voyager sales in the peak months of spring and summer flying. Program includes newspaper and magazine advertising. William T. Klenke, Jr., sales manager, said the program was part of a merchandising plan which also included strategic location of planes in the East and West Coast for fast deliveries on new orders, and to take care of dealers who were not called upon to stock planes during the slow selling winter months.

FLIGHT TRAINING DROPS–CAA report for February shows a drop for virtually every category of aviation training from the figures of Feb. 1947. Comparisons: student pilot certificates, 10,191 as against 12,881; private pilot certificates, 6263 as against 6692; commercial pilot certificates, 437 as against 433 (the only gain noted); airline transport pilot certificates, 65 as against 181; mechanics certificates, 745 as against 1249; ground instructor certificates, 200 as against 273; flight instructor ratings, 186, as against 492; and instrument ratings, 105 as against 280. However total number of airports, as of April 1, had increased to 5906 as compared to only 4729 on the same date a year ago. Of the airports, 2919 were commercial and 1856 municipal. In size, 3666 were class 1 or under.

–ALEXANDER McSURELY

Paris Letter:

Wringer for French Air Industry

Better planes for less money, ousting of Communists, are main objectives in the overhaul of nationalized setup.

PARIS—Plans to put France's nationalized aircraft industry through the wringer continue to move ahead. Behind these plans lie two objectives. First, to produce better planes and save the government money. Second, to weed out the pro-Communists from positions of influence.

Premier Schuman, meeting with interested ministers, recently decided to cut back employment in government factories to 30,000. Twelve thousand workers already have been fired in recent months, bringing the present number of employes to about 60,000.

Part of the cut will be effected by turning back to private industry some of the reconverted plants now making non-aircraft products. These plants, it is hoped, will have some standby military value, but they will be out of the industry at present. Other plants will be shut down completely.

Governmental representatives will be given more influence in the running of the nationalized air-frame and engine firms, and a "brain-trust" will be created in the Air Ministry to guide the industry's development.

The ax has begun to fall among the top administrators of the industry. Most of these men were appointed under the regime of Charles Tillon, a Communist who was Minister of Air until late in 1946.

The heads of the government engine firm (S.N.E.C.M.A.) and of two of the four air-frame builders (Sud-Est and Centre) have been sacked. The general in charge of the aircraft industry for the Air Ministry has been relieved of his post. The chief of the Air General Staff was changed early this year. The position of the head of the government's aviation research organization is also threatened. Starting at the top, it's expected the purge will be carried down through the ranks of government aviation.

Obvious political as well as administrative reasons lie behind French aviation's current shakeup. There's no implication that all those concerned are Communists or pro-Communist. But some are definitely so, and some of their subordinates are.

This question of political security is emphasized by the new world lineup. France recently signed a military alliance with Britain and Benelux, and there's little doubt at whom this alliance is directed. Furthermore, French military and naval aviation have no new combat planes. The French industry by itself is not far enough advanced to supply them for at least a couple of years. New planes, production licenses and research cooperation from Britain or America or both are wanted, which obviously involves security questions.

* * *

Meanwhile the Communists have organized "Aeronautical Defense Committees" in the principal plants to protest against the cutbacks. They accuse the present government of selling out French aviation for the benefit of the American industry.

The head of the aircraft constructors association defends the French industry by pointing out the financial difficulties caused by slow government payments, low prices and the fact that France has had only three years since the war to develop new prototypes, compared to the five years generally recognized as necessary abroad.

But France's principal new transport plane now actually in service, the Languedoc-161, illustrates some of the economic failings of the French industry. The 4-engine Languedoc carries 33 passengers for 750 miles, compared to 55 passengers over 1550 miles for the DC-4. And the Languedoc requires 38 maintenance man-hours per hour of flight compared to 18 man-hours for the DC-4. Nevertheless Air France has 17 Languedocs in service and more on order, compared to 14 DC-4s.

* * *

Paris is going to get an airfreight exchange similar to the London "Baltic" exchange. This should enable further expansion of business and better return load factors. At present, with French charter capacity expanding, it's estimated only a tenth of the available freight space is actually being utilized.

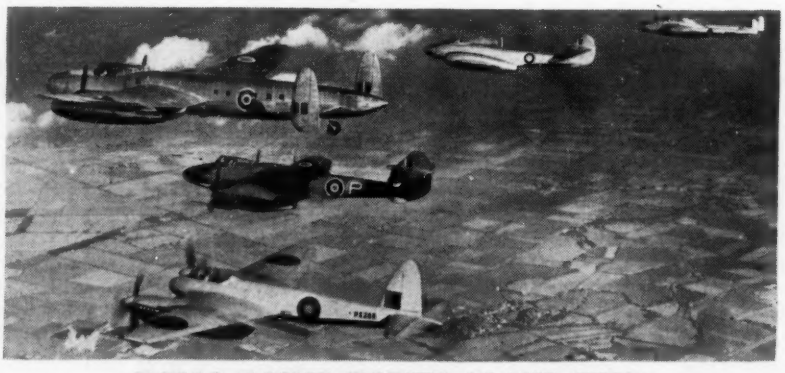
The new exchange was decided on by the Committee on Air Transport of the International Chamber of Commerce, headed by C. R. Smith, chairman of American Overseas Airlines.

LAV Plans More Flights

CARACAS—Linea Aeropostal Venezolano, Venezuela's national airline, plans to increase its weekly Constellation flights from three to five on the New York-Havana-Maiquetia route.

LAV has also been authorized by the Venezuelan Congress to increase its capital from $5,940,000 to $11,880,000.

The money will be used to cancel outstanding obligations, purchase two Lockheed Constellations, two Martin 202s, eight new engines, as well as to convert 10 DC-3s into carriers. Remainder will be for replacement parts and to move the maintenance base from New York, where work is now done by Lockheed Aircraft Service on contract, to the Maiquetia airport near the seaport of La Guaira in Venezuela.



ROLLS ROYCE POWER PLANT TEST

Flight testing Rolls-Royce power plant installations are (reading from top to bottom): the DH Vampire powered by a Nene; the Meteor driven by two Derwent jets; the Avro Lancastrian by two Nene jets and two Merlins; the Gloster Meteor powered by two propeller jets; and the DH Hornet using two Merlin engines. Here, propeller blades of Lancastrian are feathered while jet engines are being utilized for propulsive force.

AIR TRANSPORT

Proximity Devices Returned to Lab

CAB calls back regulation for installation of terrain clearance indicators as tests show lack of reliability.

Terrain proximity indicators, hailed last year as a major aid to commercial airline safety, have failed to live up to enthusiastic advance notices.

The Civil Aeronautics Board has rescinded a regulation requiring installation of the devices by May 15 on all aircraft used in scheduled service and carrying passengers at night or under instrument flight rule conditions. The Board said recent tests conducted by the Technical Development Service of CAA confirm the fact that indications given by presently available equipment prove to all purposes that they are not sufficiently reliable.

▶**Rule Adopted**—An order requiring use of absolute terrain proximity indicators was adopted last October and carried out recommendations made in July by the President's Special Board of Inquiry on Air Safety headed by former CAB Chairman James M. Landis. The safety board was spurred to action following a Capital Airlines (PCA) accident near Lookout Rock, W. Va., last June in which a DC-4 struck a Blue Ridge mountain peak 150 ft. below the fog-shrouded crest.

Information presented to CAB and the safety board last year had indicated a pressing need for the new equipment, and evidence was introduced showing that devices of sufficient dependability had been developed to warrant their installation as secondary navigational aids. The regulation requiring use of the indicators was to have been effective for a two-year period, during which the practicability of the device could be thoroughly tested and an opportunity provided for development and refinement.

▶**Poor Results**—But CAB has now reported that operational experience of several airlines which have equipped their planes with various models of terrain proximity indicators does not bear out information previously presented. The airlines found that the indicators require an unusual amount of maintenance to assure their continued operation.

One carrier reported more than 70 cases of malfunctioning for the 30 planes equipped with the device during a two-month period. Another (TWA) was required to change 177 units on 92 aircraft during a four-week period. "Such a high rate of malfunctioning," CAB declared, "would undoubtedly result in numerous delays, if not cancellations of scheduled flights under the present regulation.

"In addition, the device, which is intended to give indications at predetermined altitudes, is reported to give such indications at other than the predetermined altitudes. These erroneous indications may be due to equipment deficiencies or external causes, such as electrical interference, rain and wet snow.

▶**Pilots Lack Confidence**—"The relative frequency of such unreliable indications has apparently caused a lack of pilot confidence in the devices presently being used. Of particular significance is the fact that certain conditions cause an indication of altitude higher than the actual altitude, thus giving the pilot a false sense of security."

CAB said it still believes it is desirable to have a device which would give the pilot not only a more definite indication of proximity to hazardous terrain and other objects, but also more complete information of relative location. The Board added that it intends to observe carefully the results of experimentation in the field and will take appropriate action to encourage the development and utilization of devices proved to be dependable.

▶**ATA Attitude**—Milton W. Arnold, vice president-operations and engineering of the Air Transport Association, stated flatly in a letter to CAB that the indicators are still in the experimental stage and cannot be considered satisfactory equipment in day-to-day operation. He declared that in view of the difficulties encountered it would be practically impossible to maintain airline schedules under the regulation which was to become effective this month.

Some of the troubles with terrain proximity indicators cited by various airlines follow (types of equipment used appear in parentheses):

• **American** (RCA AVQ-6 and military APN-1)—While equipment is desirable, greatest difficulties are: (1) Altimeter receiver sensitive to external ignition or electrical noise which has the effect of indicating higher than actual altitude; (2) operational variations in vacuum tubes show up as errors in altitude indications; (3) unit can be shop-calibrated, but calibration lost in operational service; (4) altitude indications affected when flying through rain; (5) test equipment for making altimeter adjustments too complicated and bulky.

• **Capital** (Military APN-1)—During February and March made 31 unscheduled removals from DC-3s, and eight from DC-4s. Basic troubles: tube malfunctionings, defective relays, defective altimeter indications, loss of calibration.

• **Continental** (Hughes XED-13A)—Chief objection is lack of reliability due

Continental Eyes the Customer—Electrically

A new aid for busy station agents is being installed by Continental Air Lines at all its ticket counters. Agents who may be in the back office or on the loading dock are alerted to a passenger's approach to the ticket counter by a photoelectric cell arrangement. The "electric eye" shoots a beam across the top of the ticket counter. When a passenger breaks the beam by standing at the counter, the agent is warned automatically by a light or chime. The new device, which can be installed for about $50, is especially helpful at small stations with limited personnel.

to false indications. Unable to secure more than 100 hours of operational service before replacement required. After seven months operation, equipment found to be poorest performing on the carrier's planes as far as reliability is concerned.

• **Eastern** (RCA AVQ-6)—During February and March, based on 30 aircraft used 8½ hours daily, there were 27 tube failures, 10 component failures, four miscellaneous adjustments, 15 reports of inoperative or erratic operation and 15 reports of radio altimeter indications higher than barometric altimeter. Reports stated that when flying in heavy rain the radio altimeter gives a much lower altitude indication than the true altitude of the plane. "Drop-out" altitude appears to be extremely variable.

• **Mid-Continent** (Hughes XED-13C)—On the basis of limited experience, 45 separate pilot's flight reports were received indicating unsatisfactory operation of equipment. Reasons: incorrect "drop out," completely inoperative units, instances of altitude warning lights remaining on continually and erratic operation.

• **Monarch** (Hughes XED-13A) — Found unit unreliable electrically, with troubles developing after only two or three hours of service. Main difficulty: extremely short life of tubes.

• **Pan American,** Latin American Division, (Raytheon CX-1075)—During February and March, 75 unscheduled removals made because of loss of calibration, erratic operation and complete loss of operation.

• **TWA** (Hughes XED-13)—Average service time only 109 hours. During a four-week period forced to change 177 units on 92 aircraft. Majority of difficulties classed as operative, false indication and erratic indication. Troubles apparently caused by failure of modulator tubes resulting from current overload, manufacturing errors in the antennas and failure of antenna connectors due to vibration.

• **United** (Raytheon CX-1100)—Irregular removals of radio altimeters in February and March totaled 94 on DC-3s and 43 on DC-4s. It is estimated that incidents of irregular removal will be about twice that for other radio gear. Company believes, however, the device has proved useful.

• **Caribbean-Atlantic** (Hughes HTR-13A)—Operation has been relatively trouble-free with exception of one instance of a shorted condenser.

Purchasing Agent

Air Carrier Service Corp., Washington, has been appointed U. S. purchasing agent for Bharat Airways, Calcutta, India, and Malayan Airways, Penang, Federated Malay States.

ALPA Loses Decision

The Air Line Pilots Association has lost its fight to prevent CAB from carrying out its order granting National Airlines increased mail pay.

U. S. Court of Appeals for the District of Columbia denied the union's plea to stop payment pending review of the CAB order and also dismissed the pilots' petition for review. The court cited ALPA'S "failure to disclose a substantial interest in the order sought to be reviewed."

Based on conditions existing prior to the current strike, CAB had increased National's mail pay by more than $400,000 during the last half of 1947 and also raised the carrier's rate for 1948. ALPA, which has been on strike against NAL since early February, charged that CAB in effect was bolstering the company in its dispute with the pilots.

Alaskan Case Expanded

A CAB investigation instituted last March to determine whether Pan American Airways, Northwest Airlines and Pacific Northern Airlines are rendering adequate cargo service over their certificated routes between Alaskan and U.S. points has been expanded. The Board has now ordered that pending applications of Northern Airlines, Wien Alaska Airlines, Mt. McKinley Airways, Pacific Northern Airlines, Alaska Airlines, U.S. Airlines and Alaska Transportation Co. for U.S.-Alaska routes be considered in the same case.

Atlanta Inauguration

Capital Airlines plans to inaugurate service to Atlanta, Ga., on May 12. The city was certificated to Capital in CAB's Boston-New Orleans route decision early this year when the carrier's routes were also extended to New Orleans and Mobile.

CAB SCHEDULE

May 14—Prehearing conference on applications for new Southern Transcontinental Service. (Docket 1102, et al.)

May 17 — Prehearing conference on Board's investigation of U. S.-Alaska cargo service. (Docket 3286.)

May 24—Hearing on Board's investigation of North Atlantic passenger fares. (Docket 3284.)

May 24—Prehearing conference on control of Parks Air Transport. (Docket 1670.)

May 26—Hearing on suspension of All American Aviation's pickup route certificate. (Dockets 2918 and 3293.)

June 23—Hearing on Board's investigation of Pan American Airways' Miami-St. Thomas tariffs. (Docket 3274.)

July 12—Hearing on Capital Airlines mail rate case, postponed from June 14. (Docket 484.)

92 ton feather

The U.S. Navy's Lockheed Constitution (big brother of the famed Lockheed Constellation) weighs 92 tons—twice as much as the average airliner.

Yet its five-ton, dual tandem landing gear is so finely articulated that the plane can land light as a feather.

So light, in fact, that there's a signal in the cockpit to inform the pilots when the prerotating wheels touch the ground during a landing.

The gear spreads the weight of the Constitution over such a large area that the airplane can operate from any normal CAA Class 4 airport without strengthening or lengthening of runways.

More than 50,000 engineering man-hours went into Lockheed's development of the remarkable gear.

Such pioneering in design and research, in combination with resourceful production techniques, keeps Lockheed well in the forefront of aviation.

Lockheed Aircraft Corporation, builders of the U. S. Navy P2V Patrol Bomber, holder of the world's long-distance non-stop record (11,236 miles); the P-80 Shooting Star, the U. S. Air Force's standard jet fighter; and the Constellation, world's leading transport.

look to lockheed for leadership

Lockheed Constitution

Copyright, 1948, Lockheed Aircraft Corp.

Railroad Group Plans Fight For Integration

Transportation Association of America, generally considered a railroad "front" organization, has established a nationwide organization presumably to promote its plan for a single transportation regulatory agency and integration of ownership among various modes of transport.

This was the most significant disclosure at a recent two-day hearing on over-all national transportation policy before the House Interstate and Foreign Commerce Committee, headed by Rep. Charles Wolverton (R., N. J.), who agrees with TAA on transportation integration.

▶ **Hearings Repetitious** – The hearings were little more than a repetition of the pros and cons on joint ownership and unified regulation of transportation that have been put forth periodically over the past ten years. Enactment of the 1938 Civil Aeronautics Act provided separate regulation of air transport and touched off a drive by railroads to bring it under the jurisdictional surveillance of the Interstate Commerce Commission.

Air Transport Association's executive vice president, Robert Ramspeck, and Harry Brashear, representing Aircraft Industries Association, argued the case against transportation integration, maintaining it would block full and natural development of air transport, and with it, development of the aircraft manufacturing industry.

▶ **Single Agency**–Single-agency regulation of transportation, Ramspeck declared, would mean the establishment of "the sphere of operation of each form of transportation," bar dynamic development of air transport, and "blast the very rock bed of the transportation system" by precluding competition between differing modes of travel.

Carter Fort, vice president, presented the Association of American Railroads' arguments for integration of ownership and unified regulation.

Alvin Barber, representing the U. S. Chamber of Commerce, steered a middle course, reporting that his organization endorsed the "ultimate" establishment of a single regulatory agency, but believed that "for the time being there is still need for separate regulation of air transport." He opposed a flat bar on surface carrier ownership of air carriers, recommending that each case be considered on its own merits.

▶ **Study Project**–Donald Conn, representing TAA, refrained from repeating his Association's long-standing advocacy of transportation integration in testimony before the committee, but instead disclosed plans for a nationwide "study" project to draw up a new national transportation program. Since the Association's main function has been the promotion of transportation integration, its "study" project is taken in informed quarters as a new all-out drive to this end.

The organization for the project, entitled "Cooperative Project on National Transportation Policy," reaches down to the grass roots and has two divisions: an "economic-statutory" division; and, significantly, a "public relations" division. Work of the organization will be coordinated and controlled by the directors and staff of TAA.

It will have a counsel and full-time legal staff, as well as a legal advisory group and advisory panels of transportation users, investors, operators, and economists.

TAA's membership will form the background of the organization's public relations division, which will work through "regional advisory forums" of leaders in agriculture, industry, finance and transport, and representatives in all cities, as well as 125,000 representatives in rural districts and towns up to 10,000 population.

Dependable steel products for your maintenance and production applications . . . available for your steel-buying convenience at twelve conveniently located Ryerson plants. Large stocks plus unequalled steel-service facilities make Ryerson a time-saving source for every steel-from-stock requirement. Because of great demand, all sizes are not always on hand, but we can usually suggest a practical alternate. Call our nearest plant for quick shipment—a few pounds or a carload.

PRINCIPAL PRODUCTS

BARS—Carbon, alloy, stainless—hot rolled, cold finished

STRUCTURALS—I and H beams, channels, angles, tees, zees

PLATES—Including Inland 4-Way Floor Plate

SHEETS—Including Allegheny Stainless

TUBING—Seamless low carbon and stainless, boiler tubes

BUILDING STEELS—Reinforcing bars and accessories, expanded metal

MACHINERY & TOOLS—for metal working

OTHER PRODUCTS—Chain, wire rope, Babbitt metal, etc.

JOSEPH T. RYERSON & SON, INC

Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles

Air Parcel Post To Be Expanded

The Post Office Department is working on plans for large-scale expansion of its recently-instituted international air parcel post service.

Inauguration of service in March to 21 countries, mostly in Europe, Africa and the Middle East, found traffic volume and the average size of packages exceeding estimates of Post Office officials.

▶ **New Service**—At first, packages could be mailed only from points within continental U. S. But early last month the Post Office permitted origination of international air parcel post from Alaska, Hawaii and other U. S. possessions. Packages may be dispatched to Europe at the same postage rate charged for service from continental U. S.

Meanwhile, the Post Office Department has drawn up plans for extending international air parcel post to South America. The proposal has been presented to the Postmaster General for approval.

▶ **Volume High**—From Mar. 16—when service was inaugurated—to Mar. 31, air parcel post volume out of LaGuardia Field to foreign points averaged about 1000 lb. daily. Average weight of parcels dispatched was about 2¼ lb.

Heaviest flow of international parcel post was to Italy, followed by Great Britain, Greece and Czechoslovakia. Pan American Airways, TWA and American Overseas Airlines, which are handling most of the shipments, have found poundage already is equal to about one-seventh of normal air mail traffic.

Parks Air Lines Issued Temporary Certificate

Parks Air Lines, East St. Louis, Ill., has been issued its temporary certificate covering feeder routes in the Great Lakes and North Central areas.

CAB's latest action was taken following a showing by the carrier (formerly Parks Air Transport) that adequate airport facilities will be available by May 1 to permit inauguration of service at 21 of the 41 points authorized. In its North Central Area decision of December, 1946, and Great Lakes opinion of September, 1947, CAB designated Parks for the local routes but withheld the certificate pending a showing of sufficient airports to make the service practicable.

The Board temporarily stayed the inauguration of service between Chicago and Minneapolis/St. Paul and between Chicago and Burlington, Iowa, because adequate airports are not yet available on those segments.

NEW CLEANING MANUAL
Now Available FREE!

Contains results of more than 20 years of laboratory research, field service tests and practical application at major air bases and factories.

TURCO

MAIL COUPON TODAY

Turco Products, Inc.
Dept. AW-4
6135 S. Central Ave., Los Angeles, Calif.
Please send me without obligation your new aviation cleaning manual.

NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

PACKAGES OF *Safety* AT YOUR FINGER TIP

INTERNATIONAL FLARES

Approved Equipment for Ryan Navion

With International Parachute Flares a forced landing can be a safe one. 120,000 candle power is at your command with the bracket of three (one and a half minute) flares, illustrated above. In brackets International Flares are electrically operated. They are also available for operation with International Flare pistols.

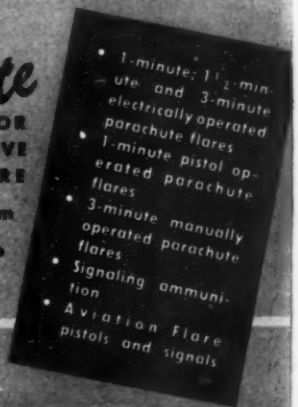
Effective at height of 1000 feet, the parachute flare burns brilliantly, giving plenty of time and light for emergency landings.

International flares can be used to make night observations. Their use for this purpose frequently eliminates the necessity for a forced landing and prevents an accident.

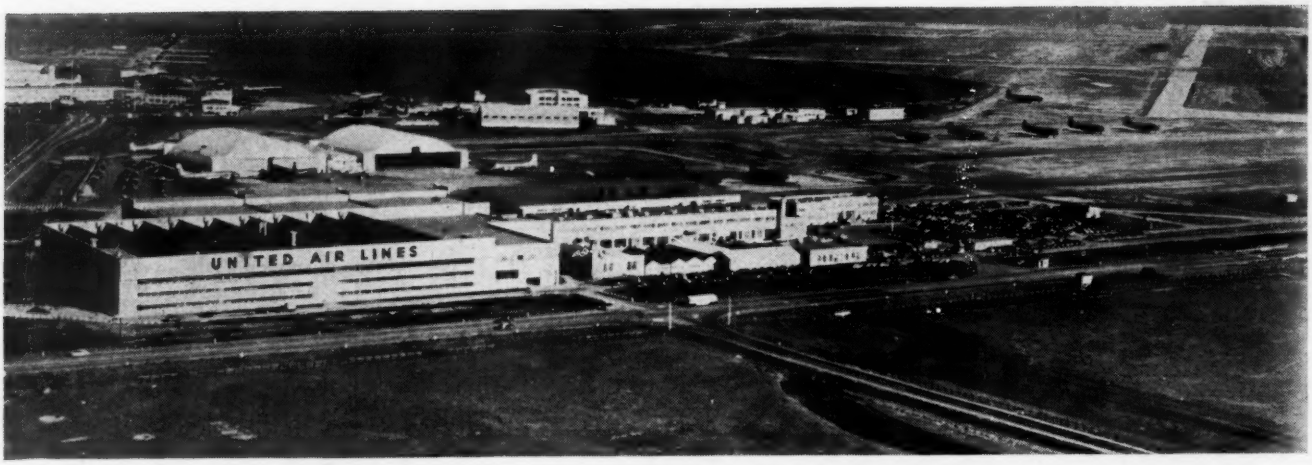
Don't fly at night without International Parachute Flares. A complete line of landing Flares meeting all C.A.A. requirements.

Write FOR DESCRIPTIVE LITERATURE

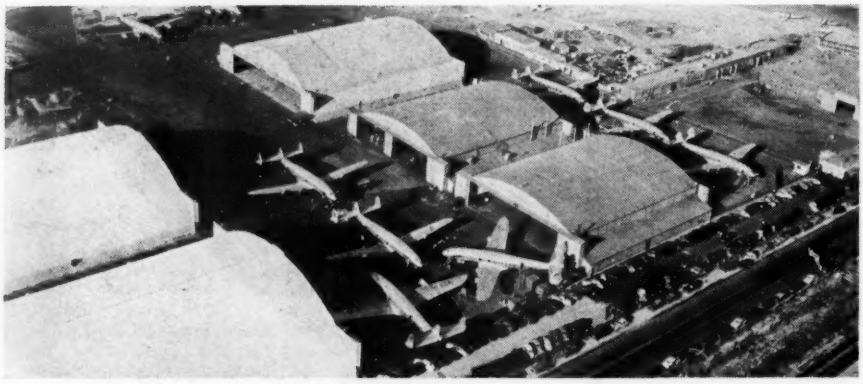
Priced from $90.00 to $230.00


• 1-minute; 1½-minute and 3-minute electrically operated parachute flares
• 1-minute pistol operated parachute flares
• 3-minute manually operated parachute flares
• Signaling ammunition
• Aviation Flare pistols and signals

KILGORE MFG. CO.
International Flare Signal Div.
WESTERVILLE, OHIO



HUGE BASES such as that of United at San Francisco pose a problem for . . .



. . . independent operators like Lockheed Aircraft Service (Burbank headquarters above).

End of 'Pooled Maintenance' Boom?

Tendency of large airlines to seek outside work for new facilities may cut field of independent operators.

By STANLEY L. COLBERT

Aircraft maintenance operations have grown in size like the planes they must accommodate. The investment in a big base to handle big planes is so substantial only the largest transport companies can afford it. This has spurred the rise of independent maintenance firms.

Such organizations as Aircraft Maintenance Corp., Pacific Airmotive Corp., and Lockheed Aircraft Service, Inc., got their real foot-hold when war surplus aircraft had to be reconditioned. They pegged high hopes for the future on the fact that the then growing number of nonscheduled carriers, together with some scheduled carriers, needed maintenance and overhaul and couldn't afford their own facilities.

Developments by last week indicate that the independent "pooled maintenance" boom may peter out before it has a chance to begin:

• On the West Coast, United Air Lines formally opened its $5,000,000 maintenance base: a 116-acre hub which will service UAL's DC-4s and DC-6s in 700,000 sq. ft. of modern-equipped buildings, and which the company hopes will handle maintenance for other airlines.

• In the South, at the former Miami Air Depot, Pan American Airways has started a $2,500,000 maintenance and overhaul shop. Says PAA: "Some engine overhaul work will be done . . . for several other airlines."

• East Coast maintenance bases are complaining they cannot get kits or drawings to modify DC-4s according to CAB fire prevention regulations. Reason: Douglas Aircraft wants to hold the workers at its Santa Monica plant after DC-6 orders are completed and intends to do so by performing its own modifications.

• Suffolk County Airport, Long Island, will be operated as a major overhaul and maintenance base for passenger and cargo planes by the Scheduled Airlines Maintenance Corp. Negotiations are being carried on with several airlines for services which will include short work at LaGuardia, New York International and Newark Airports, and major overhaul at the 1300-acre base. This may be part of the 'pooled' maintenance plans, sponsored either in presence or in spirit by the major airlines without their own overhaul facilities.

Viewing those factors, here's what maintenance operators see:

• An airline maintenance pool in the offing, as carriers who do their own overhaul attempt to amortize their investment by performing work for other carriers.

• A move on the part of a major manufacturer (which could very easily be followed by other manufacturers) to make modifications on its planes.

• A personal plane maintenance program which has never interested them completely, because revenue from this source is yet light.

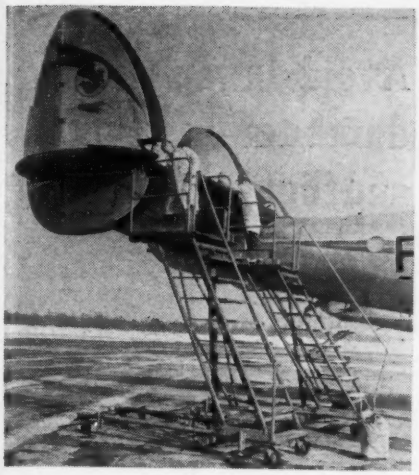
• A decrease in the number of nonscheduled carriers who, lacking facilities, must rely completely on maintenance operators.

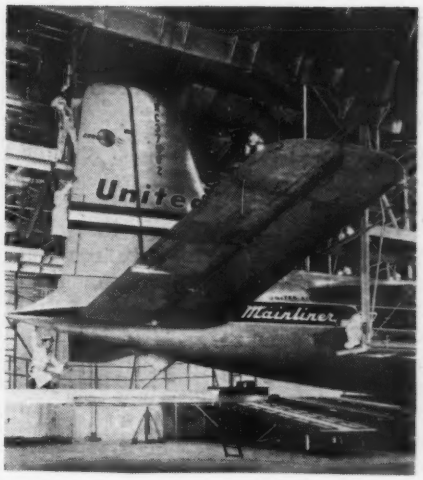
But the black picture also has highlights; most of them in the future. None seems promising enough at this time to keep all the maintenance operators alive and content.

• Executive type aircraft offer potential business. So far, only Lockheed Aircraft Service is attempting to tap this market on a large scale.

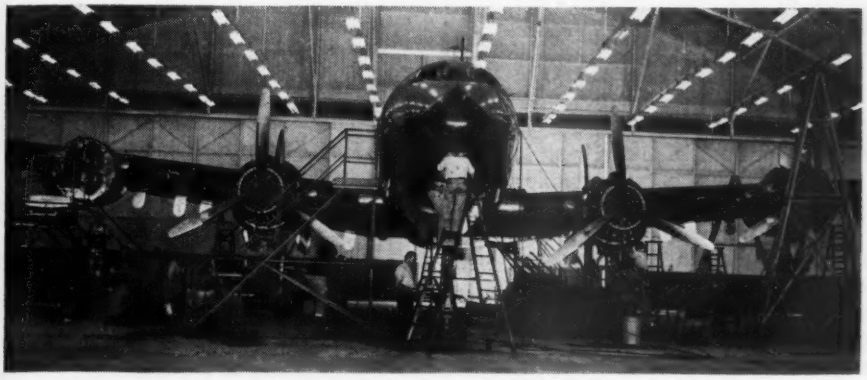
• Air Force contracts are in prospect, as recommended by the policy reports. Even the cream off the top of this work though is hardly enough to keep one firm in business for a long period of time.

The independent maintenance operator can still rely on some non-scheduled business. But some of the carriers recently recommended for certification perform their own maintenance, and

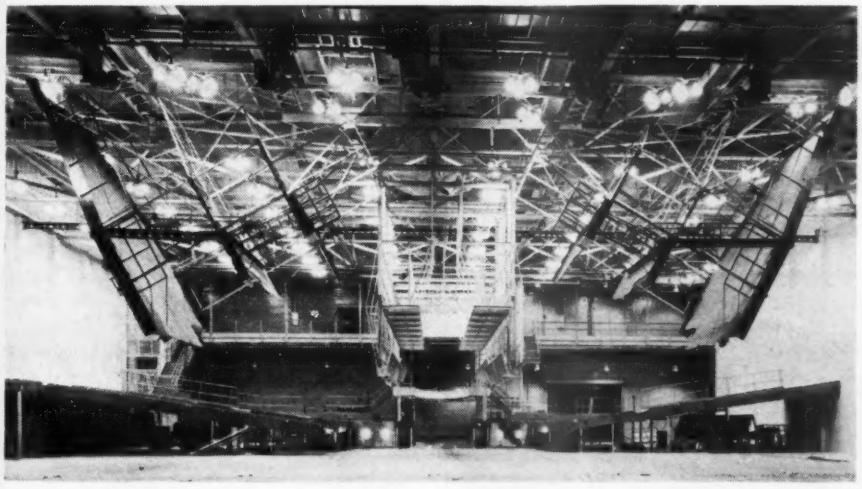




LAS used portable platforms; United's dock permits three-level work.



PORTABLE stands again come into play for engine work at LAS. . .



. . . while United's elevator dock swings up to the plane.

do maintenance work for others.

If small contract carriers must send their DC-4s to the West Coast for modifications that are estimated to take three weeks and cost over $100,000 per airplane, a few may not be able to continue operations.

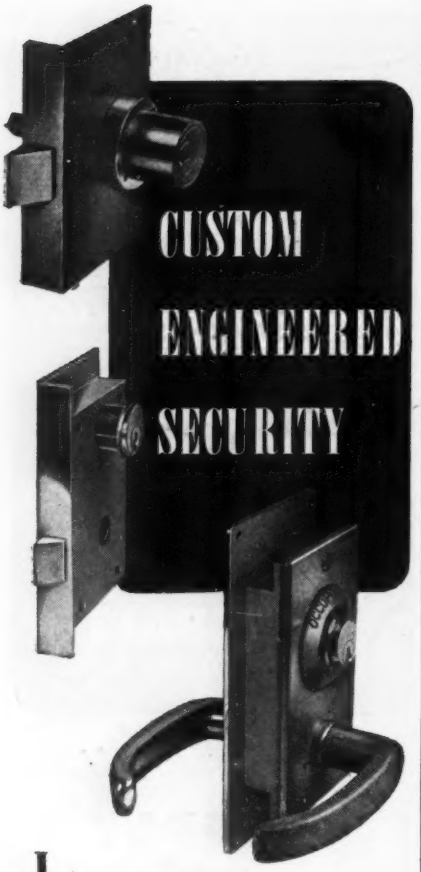
Meanwhile, United's maintenance base is employing 1400 with anticipation of doubling that number within five years. It has installed the latest mechanical devices so that aircraft can be pushed through 11 at a time. Each craft is finished within four days. The base is capable of handling up to eight complete 18-cylinder engines a day, and can perform complete repair and overhaul on radio equipment, fabrics, propellers—everything.

Pan American Airways plans to add 1000 new employes to service its maintenance base which will handle DC-4s, DC-6s, Constellations, Stratocruisers and Convair-Liners.

Slick
ANNOUNCES
Modification Service
for licensing
C-46
AIRCRAFT
Models A, D, E, F
by
SUPPLY and SERVICE DIVISION
Slick Airways, Inc.

CALL ON this division of Slick Airways to modify your C-46 aircraft for licensing. Modifications made for passenger, freight or private flying. Slick Airways licensed the first C-46s and has more than 2½ years experience maintaining its own fleet—largest in commercial use. We are qualified, equipped and authorized—by Approved Type Certificate No. 772—for licensing to CAA specifications C-46 Models A, D, E, F. We overhaul and modify Pratt & Whitney R-2800 engines. Write for detailed information.

Slick
Airways, Inc.
SUPPLY and SERVICE DIVISION
3000 N. Clybourn Ave.
Burbank, California



IT'S Always something better at ADAMS-RITE. Locks and latches that secure fuselage, compartment, lavatory or bulkhead doors are especially designed here by lock specialists to fit the requirements of the product . . . rather than forcing a product to fit the restrictions of a standard model lock. For this reason, we are the acknowledged authority on aircraft latching devices . . . to the point of supplying 90% of such equipment in use on larger aircraft. The creative men at ADAMS-RITE offer to save you engineering and experimental time on your locking problem. Such assistance is yours for the asking whenever you need it.

QUALITY HARDWARE
FOR NEARLY A HALF CENTURY

ADAMS-RITE
MANUFACTURING CO.
540 WEST CHEVY CHASE DRIVE, GLENDALE 4,
CALIFORNIA, U. S. A.

Passenger Revenues Hitting New Peaks

The nation's trunklines apparently are headed for record passenger revenue this year.

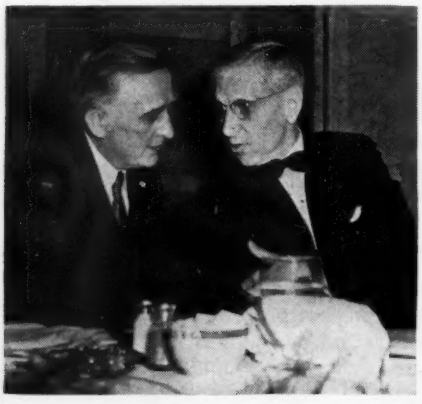
Results of first quarter 1948 operations, when compared with the same 1947 period, prominently reflect the two ten percent fare increases instituted during the past year. The first postwar fare boost became effective Apr. 1, 1947, and the second early last winter.

▶ **Sharp Increase**—In the first nine months of 1947, the 16 domestic trunklines reported receipts of 4.98 cents a passenger mile. This was considerably above the 4.64 cents a passenger mile shown for the first three quarters of 1946. But the increase in 1948 will be even sharper.

During the first quarter of 1948, Eastern Air Lines' passenger revenue reached a record $16,500,000, up 46 percent over the same three months last year. Revenue per passenger mile averaged almost 5.6 cents.

▶ **Traffic Situation**—Compared with the 46 percent rise in passenger revenue was EAL's less spectacular 20 percent gain in revenue passenger miles flown. Some of this traffic increase was due to the strike against National Airlines which occurred during the peak of Florida vacation travel.

Passenger revenues on other trunklines gained during the first quarter of this year without an accompanying increase—and sometimes a decline—in passenger miles flown. Braniff Airways reported passenger revenue of $2,318,000 in the first three months of this year compared with $2,132,451 in the like 1947 period despite a moderate traffic drop.

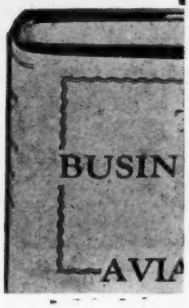


Branch Feted

Guest of honor at a recent Aero Club of Washington dinner was retiring CAB Member Harllee Branch (right), who had served with the Board since its creation in 1938. Discussing aviation problems with Branch is Sen. Joseph C. O'Mahoney (D., Wyo.). (CAB photo)

Avoid lawsuits and damages in flying and flight operations

The legal rules of aviation explained and illustrated



This sound book answers simply and authoritatively all your questions on the technicalities of the law as it applies to aeronautics—shows you each precautionary step you should take to be on the safe side. Now private and commercial pilots, airport managers and mechanics, air carrier employees, insurance agents, employees in state aeronautical commissions, airplane salesmen—anyone in the habit of traveling by air—may have the protection of the legal information they need. The book gets at the legal principles often hidden in complicated terminology—shows them to you in simple form.

THE BUSINESS LAW OF AVIATION

By GERALD O. DYKSTRA and LILLIAN G. DYKSTRA

523 pages, 5¾ x 8¾, $5.00

This valuable book supplies the aviation field with its own special reference for legal problems. It brings you an analysis of Federal and State Aeronautical Statutes in concise, understandable form. It draws from the history of court cases involving decisions concerning areonautics, those cases which bear most directly on each aspect of aviation law—sets them forth—discusses their decisions. The book touches on each aspect of aviation where the law has established rules, and where legal precedent has been set up, and demonstrates the precautionary legal details which insure your own safety.

Explains the ins and outs of the law concerning:

- —taxes
- —ownership and operation of airports
- —trespass
- —nuisance
- —negligence
- —duties of carrier to passenger
- —coverage of insurance
- —workman's compensation
- —contracts
- —bailments
- —penalties and crimes
- —international aspects

10 DAYS' FREE EXAMINATION

McGRAW-HILL Book Co., Inc.
330 W. 42 St., NYC 18

Send me Dykstra and Dykstra's The Business Law of Aviation for 10 days examination on approval. In 10 days I will send $5.00, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

Name .....
Address .....
City and State .....
Company .....
Position AW-5-10-48

($5.50 in Canada; order from McGraw-Hill Company of Canada, Ltd., 12 Richmond Street E., Toronto, 1.)

AIRviews

"Very definitely, it is not an exaggeration to state that our company believes that air freight can revolutionize merchandising."

This statement is taken from the testimony of the General Traffic Manager of a large mail-order firm given before the Civil Aeronautics Board.

It comes as the result of proved success in using air freight to save costs on interest-in-transit, inventory-in-transit, swifter turnover of stocks, and the value of being first in a community with newest products and styles.

Here at Douglas we also believe in the growing future of air freight. And we are working with the air carriers and the shippers to lower air freight costs and to step up efficiency of operations.

Right now we are working on a freight version of the huge Douglas DC-6. This giant plane will, for example, carry up to 30,000 lbs. of payload. It will cut to 8 hours the flying time between New York and Los Angeles. New methods of handling and stowing cargo aboard the DC-6 also will be tested with individual air carriers.

Until the DC-6 enters service, freight versions of the Douglas DC-4 and DC-3 continue to carry the bulk of all air freight throughout the world.

Donald W. Douglas

PRESIDENT
DOUGLAS AIRCRAFT COMPANY, INC.
SANTA MONICA, CALIFORNIA

(Advertisement)

SHORTLINES

▶ **Chicago & Southern**—Company officials reached Caracas late last month on a survey flight preliminary to extending the New Orleans-Havana route to Venezuela via Kingston, Jamaica; and Aruba and Curacao, Netherlands West Indies. DC-4 service on the new link is slated to start by midsummer.

▶ **Eastern**—Stockholders have approved a retirement income plan for employes with three years or more of continuous service. Normal retirement age will be 60 years for captains and copilots and 65 for other employees. . . . Company has asked CAB authorization to operate directly from New York, Philadelphia, Washington and other AM 6 points to San Juan, P. R. Present EAL flights to San Juan are made via Miami.

▶ **National**—Has extended DC-6 service to its Miami-Tampa-New Orleans route. Company states only four points being served when its pilots struck last February are still without flights. System includes 33 cities.

▶ **Northwest**—E. I. Whyatt, executive vice president, told stockholders at their recent annual meeting that faster planes and expanded routes should put the company in the profit column in 1948. . . . DC-4s on the Alaska and Orient runs are being equipped with sleeper seats. An adaptation of the sleeper seats will be used on NWA's Martin 2-0-2s on domestic routes.

▶ **Pacific Overseas**—Company's repair station is converting a C-54 cargo plane recently purchased by Pan American Airways from POA into a 54-passenger deluxe transport. A Wien Alaska C-47 is scheduled to undergo overhaul at the POA shops shortly.

▶ **Pioneer**—Was slated to inaugurate service from Texas points to Clovis, Tucumcari, Las Vegas, Santa Fe and Albuquerque, N. M., on May 1.

▶ **Sabena**—Has inaugurated its spring schedule of three New York-Brussels roundtrips weekly.

▶ **Swissair**—Carried 95,519 passengers in 1947 compared with 62,378 in 1946. Freight traffic was up 112 percent.

▶ **United**—Was scheduled to commence operations into the new Twin Falls, Ida., municipal airport on May 1.

▶ **Western**—Hauled 351,103 lb. of freight in March compared with 216,019 lb. in the same month last year.

▶ **Wisconsin Central**—Planned to inaugurate service to Baraboo-Portage, Wis., early this month through Bell Aero Airport. With addition of the new point, WCA will be serving 21 of the 44 cities in Illinois, Wisconsin, Minnesota and upper Michigan to which it has been certificated.

THE "AERO COMPAX"
CHRONOGRAPH
Water Resistant—Stainless Steel Case
Radium Dial

$135
Federal Tax Included

GOOD FLYING
Demands Accurate Timing

The "Aero Compax" is indispensable for instrument flying and all air operations. It tells ground speed automatically... gives time in flight to 12 hours in split seconds... totals time on each leg of flight. "Reminder" dial shows ETA. And of course, it's a dependable timekeeper as your everyday watch.

UNIVERSAL
GENÈVE
At leading Jewelers everywhere
Write for Booklet A-1
THE HENRI STERN WATCH AGENCY, INC.
© 1948 587 Fifth Avenue • New York 17, N. Y.

SEARCHLIGHT SECTION
(CLASSIFIED ADVERTISING)

Continued on page 54

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

RADIO-EXPERIENCED aircraft radio mechanics wanted by airline operating in northeast section of the country. P-4814, Aviation Week.

SELLING OPPORTUNITIES OFFERED

SALES-AGENCY—Open for live-wire. Exceptional profits possible. Must be able to hire and train salesmen. $5,000 to $15,000 required in your own business. Backed by National organization. Write qualifications National Flight System, Dick Powell, Pres., 6331 Hollywood Blvd., Hollywood, California.

NATIONALLY KNOWN manufacturer has opening for a man with thorough knowledge of polishing and buffing equipment, wheels, compositions, etc. Previous sales experience desirable. Must be free to travel. State age, experience and salary expected. Reply to SW-4749, Aviation Week.

POSITIONS WANTED

PRODUCTION LIAISON Eng'r—BAE, 1941. Familiar; exp'd in design, stress r's'ch, prod'n; fabr'n methods; organ'l set-ups, systems of control; sales. Broad eng'g. background. Desires factory prod'n staff position. PW-4817, Aviation Week.

INDUSTRIAL ENGINEER—1947 M.I.T. graduate; B.S. degree; limited experience. Desires position having emphasis on methods work with an airline which is taking the initiative in new air cargo developments. Arnold Robeck; 2322 E. 69th St.; Chicago 49, Ill.

FOR SALE

For Immediate Disposal:
Sikorsky S-44 passenger flying boat, four engines. For complete details and extremely low price, write: FS-4566, Aviation Week.

AIRCRAFT ENGINEERS

Minimum four years experience on stress analysis, aerodynamics, design, flight test engineering or flight test instrumentation design.

McDONNELL AIRCRAFT CORPORATION
Post Office Box 516
St. Louis (3) Missouri

FLIGHT TEST ENGINEERS

Several experienced flight test engineers required, who are capable of planning long range flight test guided missile program. Reply should state experience, education, salary desired, date of availability.

McDONNELL AIRCRAFT CORPORATION
Post Office Box 516 **St. Louis (3) Missouri**

WANTED
LATE C47-A OR C47-B
LOW TIME - GOOD CONDITION - NO CORROSION

CONVERSION DESIRABLE BUT NOT ESSENTIAL. SEND DETAILS INCLUDING PRICE, TIME ON AIRFRAME AND ENGINES, PICTURES OF INTERIOR, ETC. TO

W-4806, Aviation Week, 330 W. 42 St., New York 18, N. Y.
Pictures will be returned upon request.

THE EMERSON ELECTRIC MFG. CO.
NEEDS
RADAR ENGINEERS

Experienced in general theory and practice of aircraft fire control systems or experienced in design of electronic circuits of aircraft fire control systems. Requires independent thought in solving complex circuit problems including noise eliminations.

Salary commensurate with experience.

Write giving complete information to
W. N. Kennedy, *Director of Personnel*
The Emerson Electric Mfg. Co.
8100 Florissant Ave., St. Louis 21, Mo.

WANT TO BUY

Engine overhaul shop capable handling up to P & W 1830. Must be excellent condition, modern, reasonable. Give fullest details.

B.O.-4635, Aviation Week,
330 West 42nd Street, New York 18, N. Y.

BEECH HIVE

ATLANTIC's facilities were conceived specifically to serve corporation planes and discriminating owners. Little wonder that ATLANTIC is the New York home-away-from-home for Beechcrafts from all over the country. Beechcraft and Bendix Radio sales and service.

Atlantic Aviation CORPORATION
TETERBORO AIRPORT
TETERBORO, N. J.
PHONE: HASBROUCK HEIGHTS 8-1740

AERONAUTICAL ENGINEERS—
Aircraft engineers with the ability to apply the theories of structures, supersonic aerodynamics and thermodynamics to the design of high speed airplanes and guided missiles.

DESIGN LAYOUT ENGINEERS—
Two to five years' experience in airplane design.

Curtiss-Wright Corporation
Airplane Division **Columbus, Ohio**

ELECTRONIC ALTIMETER
ONLY $45.00

Brand new APN-1 14 tube electronic altimeter in original factory packing. This famous 18x9x7 unit, which weighs only 25 lbs. without plugs or cables, cost the gov't $2000 and includes a transmitter, a receiver, all tubes, an altitude meter, an altitude limit switch, and two easily installed 11' antennas. Working on the radar principle, the receiver measures the absolute altitude from 3 to 4000 feet, with precision enough for blind landings. In addition the altitude limit switch gives an alarm if the plane's height varies by more than 10 feet from a preadjusted value. Fills recent C.A.A. requirements effective Feb. 15, 1948, that all scheduled airlines must have terrain clearance indicators capable of giving warnings at 500, 1000 and 2000 ft. Another outstanding feature is that connections are provided to control an electronic automatic pilot. Send for our aircraft radio equipment catalog. Export inquiries invited.

Model for 12 to 14 volts D.C.....$75.00
Model for 24 to 28 volts D.C.....$45.00

BUFFALO RADIO SUPPLY
Dept. T-1, 219-221 Genesee St., Buffalo, 3, N. Y.

the steward-davis
100-hour warranted
R-1830-92
Conversion...
$1795 f.o.b. Los Angeles

STEWARD-DAVIS • 13501 S. WESTERN
GARDENA, CALIFORNIA • Cable STEDAV

PORTABLE HOISTS

Model A-2A
Capacity 3000 Lbs.
With instructions for modification to various heights.

VIMALERT
807 Garfield Avenue, Jersey City 5, N. J.
Delaware 3-6400

SCHOOLS

Rising Sun SCHOOL OF AERONAUTICS
ESTABLISHED 1930
"Built Upon the Success of Its Graduates"
GOVT. C.A.A. and VETERANS APPROVED
ENROLL NOW FOR NEXT CLASS
Write for Illustrated Catalog
2206-16 E. HUNTINGDON ST., PHILA. PA.

BOOKS

AIRPORTS
CAN PAY THEIR WAY

Charles A. Zweng's new book, AIRPORT OPERATION & MANAGEMENT, contains scores of workable ideas for increasing airport revenues. A practical, detailed guide for both the airport operator and the student of airport problems.
312 pp. Illus. $4.50

Other Recent ZWENG BOOKS

PARACHUTE TECHNICIAN: Construction, operation, inspection, maintenance $3.00
ZWENG AVIATION DICTIONARY: 16,000 aeronautical terms fully defined $6.00
FLIGHT ENGINEERS MANUAL: a thorough preparation for the new CAA engineer rating $4.00
NEW CIVIL AIR REGULATIONS: simple, convenient guide to the latest pilot rules. $1.00

Write for free catalogue.

PAN AMERICAN NAVIGATION SERVICE
12021 Ventura Blvd. AW 1, N Hollywood, Cal.

For Sale

★ **30 EACH R-2000-11 PRATT WHITNEY ENGINES**
Some with no time since overhaul
Priced low . . . . . Details upon request

★ **30 EACH No. 19936 OIL COOLERS - AIRESEARCH**
13 inch - Aluminum - new and used

★ **5200 EACH No. C-34S SPARK PLUGS - NEW**

★ **4 SETS No. 343-C-2 WARREN MCARTHUR CHAIRS**
New - Standard for DC4

Many other items such as DC4 and DC3 airframe parts, 1830-92 and R2000 engine parts, instruments and accessories.

ADDRESS ALL INQUIRIES TO

PAN AMERICAN WORLD AIRWAYS

DIVISION SUPPLY MANAGER, P. O. BOX 3311, MIAMI, FLORIDA

Available now:—

Aircraft

DOUGLAS-C47
DOUGLAS-D.C. 3
DOUGLAS-B. 23
DOUGLAS-C54 A&B
BEECHCRAFT-C18S
BEECHCRAFT-A.T. 11
GRUMMAN-G21
GRUMMAN-G44
LOCKHEED-12-A

GRUMMAN MALLARD

250 HOURS TOTAL TIME, 10 PASSENGER PLUS PILOT & CO-PILOT—EXECUTIVE CABIN INTERIOR —FULLY EQUIPPED—PERFECT CONDITION THROUGHOUT

100 NEW P&W 2800-83A ENGINES

Engines

P&W R1830-92
P&W R985
P&W R2000-7
P&W R2000-11
P&W R2000-13G
P&W R2800-31
P&W R2800-43
P&W R2800-51
WRIGHT 3350-35A
PACKARD MERLIN 1650-7

ARTHUR MEURER COMPANY

Tel.: Digby 4-6218 74 TRINITY PLACE, N. Y. (6), N. Y. Cable Airmeurer

AIRCRAFT SUPPLIES

FOR SALE

- **$2,600,000 DOUGLAS DC-3, DC-4, A-20, CONSTELLATION, RYAN & OTHER AIRPLANE PARTS.**
- **$2,000,000 P&W, WRIGHT, SCINTILLA, ECLIPSE, BENDIX, PESCO, HAMILTON, THOMPSON & OTHER ACCESSORIES & PARTS.**

REPRESENTATION

—also—
COMPLETE AIRCRAFT PROVISIONING PROGRAMS

TECHNICAL SERVICE

FOR SALE

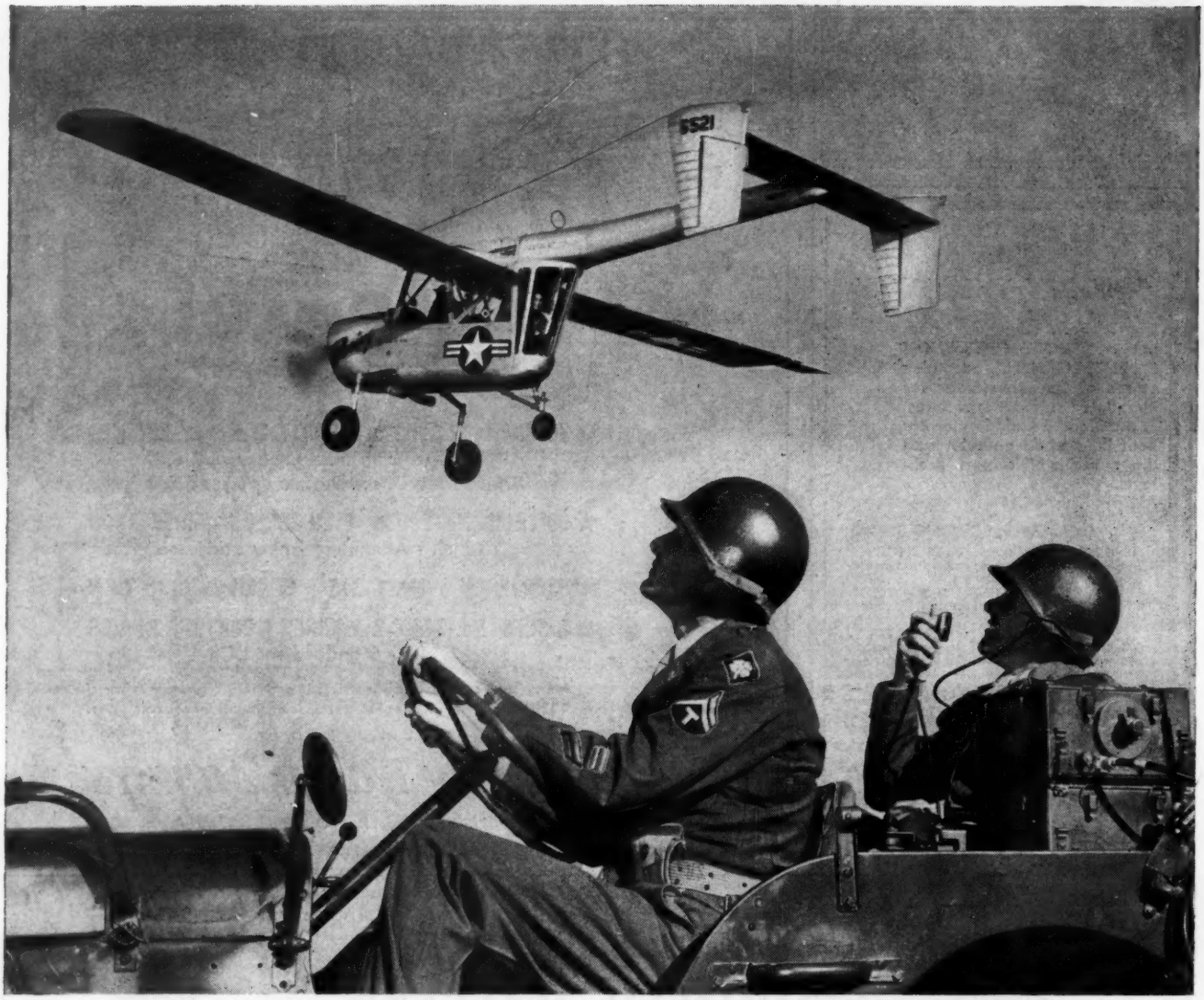
- **$200,000 C-54 TO DC-4 CONVERSION MATERIAL**
- **$400,000 AN HARDWARE.**

★ ***OUR DISCOUNTS EXCEED MANUFACTURER'S MAXIMUM***

Industrial Associates

PROMPT ATTENTION TO REQUESTS FOR QUOTATIONS, CATALOGS & INFORMATION

ADDRESS INQUIRIES: *Suite 205 357 South Robertson Boulevard Beverly Hills, California*
CABLE: INDASSO



A Boeing L-15 Scout serves as "eyes" for an Infantry reconnaissance detail.

Sharp Eyes for Our Ground Forces

The Boeing L-15—newest Army Ground Forces liaison plane—marks a long stride beyond the valiant "puddle jumpers" that served the Infantry, Artillery and Armored Cavalry in World War II.

The L-15 was designed by Boeing to meet U. S. Air Force standards and Army Ground Forces requirements. Like all Boeing planes, commercial and military, it is designed for a specific job, with maximum utility as a primary objective.

Revolutionary in appearance and performance, it can hop in and out of a small meadow without difficulty. It can cruise at about 100 mph, land at less than 35.

For safety of its crew the L-15 has armor-plate protection, blind flight instruments, self-sealing tanks, and dual cable control system. The unique gondola design with full swiveling observer's seat provides full vision—up and down, forward, backward and to either side. Powerful two-way radio maintains constant touch with the ground.

Designed for use under all conditions, from tropical to arctic, the L-15 may be operated with wheels, skis or floats. The whole airplane can be "folded up" for towing behind a jeep or loading aboard a 2½-ton standard army truck.

The L-15 is an example of effective cooperation between the Armed Forces and the aircraft industry. It was engineered and is being manufactured by the Boeing Wichita Division, which produced for the Air Force and the Navy, during the war, more primary training planes than any other plant.

A "folded" L-15 can be towed through narrow, winding woods roads.

For the Air Force, Boeing is building the B-50 bomber, XB-47 jet bomber and C-97 transport; for the Army Ground Forces, the L-15 Scout liaison plane; and for six major airlines, the twin-deck Boeing Stratocruiser.

BOEING

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—MAY 10, 1948

Adams Rite Mfg. Co. 52
Agency—The Shaw Co.

Adel Precision Products Corp. 24
Agency—The McCarty Co.

Aircraft Radio Corp. 57
Agency—Burke Dowling Adams Adv.

Ambrose Aviation Co., Frank 10
Agency—Steedle, Rankin & Boyle, Inc.

Bendix Aviation Corp. (Pacific Div.) 23
Agency—The Shaw Co.

Boeing Airplane Co. 56
Agency—N. W. Ayer & Son, Inc.

Champion Spark Plug Co. 35
Agency—MacManus, John & Adams, Inc.

Darnell Corporation, Ltd. 8
Agency—Henry L. Rhea Adv. Service

Douglas Aircraft Co., Inc. 53
Agency—J. Walter Thompson Co.

Eclipse-Pioneer Div. of Bendix Aviation Corp. 36
Agency—MacManus, John & Adams, Inc.

Edison, Inc., Thomas A. .....Second Cover
Agency—The Schuyler-Hopper Co.

Electric Auto-Lite Co., The 42
Agency—Ruthrauff & Ryan, Inc.

Esso Standard Oil Co. 26
Agency—McCann-Erickson, Inc.

Foote Bros. Gear & Machine Corp. ..Fourth Cover
Agency—The Buchen Co.

General Controls Co. 22
Agency—The McCarty Co.

Gordonay Products Co. 57
Agency—Seemann & Peters, Inc.

Kidde & Co., Inc., Walter 3
Agency—Newell-Emmett Co.

Kilgore Mfg. Co. 49
Agency—Byer & Bowman Adv. Agency

Kohler Co. 33
Agency—Roche, Williams & Cleary, Inc.

Line Material Co. .....Front Cover
Agency—Hamilton Adv. Agency

Lockheed Aircraft Corp. 46, 47
Agency—Foote, Cone & Belding

McGraw-Hill Book Co., Inc. 52

Marquette Metal Products Co., The 41
Agency—Belden & Hickox Adv.

Martin Co., The Glenn L. 29
Agency—Vansant, Dugdale & Co., Inc.

Micro Switch Corp. .....Third Cover
Agency—Hamilton Adv. Agency, Inc.

Ohio Seamless Tube Co., The 25
Agency—Howard Swink Adv. Agency

Pittsburgh Plate Glass Co. 9
Agency—Batten, Barton, Durstine & Osborn, Inc.

Radio Corporation of America 5
Agency—J. Walter Thompson Co.

Roebling's Sons Co., John A. 4
Agency—Beatty & Oliver, Inc.

Ryerson & Son, Inc., Joseph T. 48
Agency—Aubrey, Moore & Wallace, Inc.

Searchlight Section 53, 54, 55

Sherwin-Williams Co. 19
Agency—Newell-Emmett Co.

Sinclair Refining Co. 38, 39
Agency—Hixson-O'Donnell Adv., Inc.

Slick Airways, Inc. 51
Agency—Thomas F. Conroy, Inc.

Stern Watch Agency, Inc., The Henri 53
Agency—Kelly, Nason, Inc.

Texas Company, The 6
Agency—Buchanan & Co., Inc.

Turco Products, Inc. 49
Agency—Marketers, Inc.

■

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT
Positions Vacant 53, 54
Selling Opportunity Offered 53
Positions Wanted 53

EDUCATIONAL
Books 55
Schools 54

BUSINESS OPPORTUNITIES
Wanted 54

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 53-55

WANTED
Equipment 54

Arnold Stall Warning

SURE, SAFE, SIMPLE!

DIRECT SIGNAL — warning is signalled from detector units mounted on trailing edge of wing, so that it originates from stall itself and not from a related effect such as change in attack angle of wing. DOUBLE RELIABILITY—detector units mounted on trailing edge of both left and right wing panels where they can't ice up, buzzer and light in cockpit signal dual alarm. SIMPLE—detectors mount on wing surface. No extensive cutting, no interference with boots or de-icing equipment. SAFE—detectors are outside wing, proof against fuel vapors. COMPACT—detectors measure only 1"x1¼"x3⅜", weigh less than 3 oz. ea. Warning indicator may be mounted in or above panel. PROVEN—now in operation on Luscombe, Cessna, Swift, Navion, Seabee, Grumman Widgeon, and many other craft. LOW COST—only $36.00 for complete kit including two detector units, cockpit indicator and all necessary wiring. Write for illustrated folder of facts.

GORDONAY PRODUCTS COMPANY
2026 Beach St., Flint 3, Michigan

VHF COMMUNICATION and LF NAVIGATION SYSTEMS

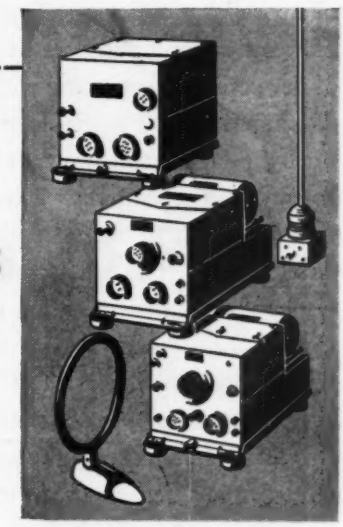
meet every Operational Need

THE A.R.C. TYPE 11A

Meets basic needs by providing for VHF Transmission, LF Range Reception and Rotatable Loop Navigation.

THE A.R.C. TYPE 17

A 2-way VHF equipment, including a tunable VHF Receiver and a 5-channel, crystal controlled VHF Transmitter.



THE A.R.C. TYPE 12 (Above)

Combines the advantages of the Type 11A and the Type 17, offering 2-way VHF, together with LF Range Reception and Rotatable Loop Navigation.

All units of these systems have been Type-Certificated by the CAA. For the highest standards of design and manufacture and the finest in radio equipment, specify A.R.C.

ARC

Aircraft Radio Corporation

BOONTON, NEW JERSEY

DEPENDABLE ELECTRONIC EQUIPMENT SINCE 1928

EDITORIAL

The Big Problem Is Still Weather

Weather is still the biggest problem facing military and civil aviation. Last year losses due to bad weather cost the scheduled commercial airlines an estimated $40,000,000. This was the difference between a comfortable profit and a staggering $22,000,000 loss. Military aviation is confronted by the same hurdle. A "fair weather" Air Force is a doubtful military asset.

It is against this background that the recent report of the Radio Technical Commission for Aeronautics Special Committee No. 31 assumes its true significance. This report blueprints, as far as is possible with the present state of the electronic art, a modernized all-weather airways and traffic control system that for the first time offers a real promise of reliable air operations regardless of weather conditions. It details a long term program of development beginning with most efficient utilization of equipment now available and going on to the production of a final target program based on maximum traffic density and operational efficiency and requiring electronic equipment far superior to anything now under development. The bill for all this is staggering on first glance—better than a billion dollars and a minimum of 15 years hard work. Yet in view of the ultimate results it seems well worth the effort. Civil cost of the program is estimated at approximately $124,000,000. If the RTCA program is largely successful this cost can be written off in less than five years of commercial airline operations alone. Over the long 15 year haul the dividends to airline operations alone should run around $600,000,000.

By tailoring its requirements to meet the needs of both military and civil aviation, the RTCA attempts to hurdle the most formidable Congressional objections to large air safety appropriations—an obstacle that has hampered progress in this field for the past two years. Strong endorsement of the RTCA program by the Joint Congressional Air Policy Board indicates that the RTCA program has already achieved significant success in this endeavor.

There remain however formidable technical and administrative obstacles. Of these the latter are apt to be the most perplexing. Certainly a more vigorous approach to the problem than has been exhibited by the Civil Aeronautics Administration is necessary if the RTCA program is not to bog down completely. It may be that the new CAA Administrator Del Rentzel with his vigorous personality and long background in aeronautical radio problems will be able to prod CAA into the kind of action needed. If not it may be necessary, as Hector Skifter, president of Airborne Instruments Laboratory, has already suggested, to organize a new agency specifically charged with the technical and administrative supervision of the RTCA program. This program is too important to all portions of aviation to tolerate its strangulation in a maze of governmental red tape.

The RTCA blueprints will undoubtedly require technical revision in light of electronic research progress. Care must also be exercised to see that it continues to meet the needs of all segments of aviation, particularly that the private flyers are not squeezed out of the picture. The fullest publicity should attend both its technical and administrative progress.

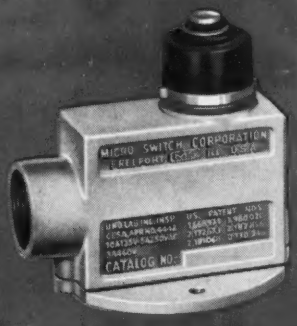
The success of the RTCA program during the next decade may be in a large measure the yardstick by which the progress of aviation as an integral part of the national economy and defense system can be gauged. It is one of the most important post war undertakings in aviation and deserves the active, genuine support of everybody in this business.

MICRO *Precision Switches*

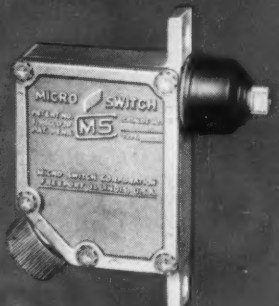
choose your switch requirements from the complete "MICRO" line

Varied shapes—sizes—actuators and capacities

MICRO LMR aircraft switch has sturdy die cast aluminum housing. Mounting holes make possible four position mounting on either face. Rotary lever arm actuator is adjustable through 360 degrees. Total travel of roller arm is 90° in either direction. AN number 3233.



MICRO die cast enclosed switch is compact. It combines ruggedness with light weight and has high electrical capacity. It is used on military and commercial aircraft.



MICRO Type "H" housing switches provide a light weight, compact, high capacity electrical switch with long life expectancy. "H" housings are light weight, die-cast aluminum.

•The complete line of snap-action switches offers 3,900 varieties of shapes, sizes, weights, actuators and electrical characteristics so necessary to meet varied requirements. The "Know-How" gained by making this extensive line has resulted in outstanding dependability and long-life operation. The completeness of the line has made *the line* desirable to meet requirements of design engineers.

Exact repeatability of operating point is an outstanding feature which is a result of carefully controlled manufacturing methods. You can depend upon a MICRO precision switch to operate at the same point each time throughout the life of the switch. This perfection is the result of wide engineering experience.

Call on the "Know-How" of "MICRO" engineers.

The V3-1 MICRO Precision Switch is no larger than your thumb, but is dependable in performance

Suitable for use where limited space is available. It has a plastic case, is light weight and is durable. Terminals are heavy gauge brass with number 4 screws and lock washers. AN number 3234.

D-C Ratings
28.5 volts, 6 amperes at 45,000 ft. altitude
28.5 volts, 10 amperes at sea level
Probable Contact Life . . 25,000 Operations

BRANCH OFFICES: CHICAGO 6, 308 W. Washington St.; NEW YORK 17, 101 Park Avenue; CLEVELAND 3, 4900 Euclid Avenue; LOS ANGELES 14, 1709 West 8th St.; BOSTON 16, 126 Newbury Street

SALES REPRESENTATIVES: PORTLAND, ORE., 917 S. W. Oak Street; ST. LOUIS 5, 6625 Delmar; DALLAS, TEXAS, Irwin-Keasler Bldg.; TORONTO, Ontario, Can., 11 King St.

© 1948 First Industrial Corp.

MICRO SWITCH
A DIVISION OF FIRST INDUSTRIAL CORPORATION
FREEPORT, ILLINOIS, U.S.A.

Experts said it couldn't be done!

The history of aviation is the history of engineers doing the impossible.

Not so many years ago, experts claimed that an airplane supported by propeller blades alone was an impossibility. Yet here is the Sikorsky S-51 Helicopter opening up new possibilities in rescue missions on sea and on land, carrying mail to congested cities, dropping into and rising from spots hardly larger than the diameter of its swinging rotors.

The transmission that drives the rotor of this revolutionary craft is produced by Foote Bros. Gear and Machine Corporation.

Incorporated in this transmission are "A-Q" (aircraft quality) Gears that have brought to industry a new conception of gearing performance. Light in weight —compact in size—low in noise level—they permit carrying excessive loads at extremely high speeds.

Foote Bros. "A-Q" Gears may offer your engineers a solution to a difficult problem they face.
Foote Bros. high quality commercial gears are backed by the complete facilities of Foote Bros. large plants plus nearly a century of gear manufacturing experience.
Foote Bros. Actuators and Power Units provide a new approach to power control on aircraft or, in fact, wherever designers face unique problems in control.
Foote Bros. Speed Reducers offer a wide range of sizes and ratios in both worm and helical types to meet any reduction requirements.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. AVW, 4545 South Western Boulevard Chicago, Ill.

This complete packaged drive is produced for the Sikorsky S-51 by Foote Bros. It is a self-contained, self-lubricated double planetary transmission with angle take-off. Spur and spiral bevel gears are "A-Q" (aircraft quality).

FOOTE BROS.

Better Power Transmission Through Better Gears